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Assistant Editor: A. R. PARKES, M.I.B.F.

Commercial Editor: P. E. CARDEN.

Advertising Manager:
F. BARRINGTON HOOPER, B.A.

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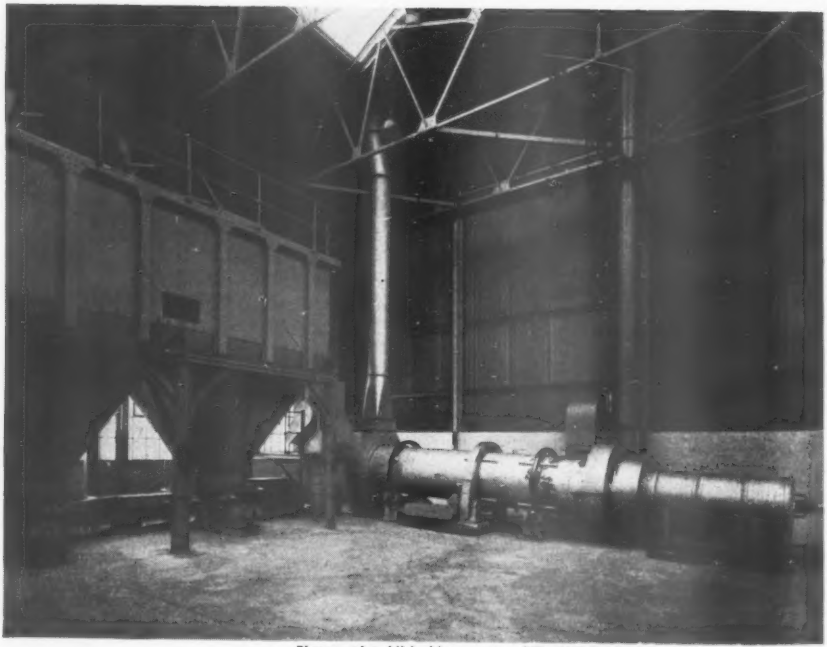
CORE SHOP PLANT in a LARGE IRONFOUNDRY

Photograph shows:

A section of the Core Shop Plant in a Large Ironfoundry. Two large Rotary Storage Hoppers feed the Wet Sand on to a Belt conveyor and then to a Belt and Bucket Elevator to the Gas Fired Rotary Sand Drier. The dried Sand is then Pneumatically conveyed to Large Storage Hoppers in the Mixing Section.



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Photograph published by courtesy of The Hill Top Foundry Co. Limited, Wednesbury

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The Foundry Exhibition

A cordial invitation is issued to all interested in our industry to visit the Foundry Exhibition to be held at Bingley Hall, Birmingham, from May 21 to 30. Especially is this welcome extended to readers overseas in good time, it is hoped, for them to make their plans, bearing in mind that the exhibition period is about the best time of the year to visit this country. Whilst it will be easily the biggest of the dozen or so exhibitions previously held in this country, yet the Bingley Hall show will not be so vast as to prevent the examination of every stand in detail. Notwithstanding the all-embracing title, there is to be a minimum of exhibits not directly connected with the economic manufacture of castings.

Although the exhibition is to be predominantly a show of foundry equipment and supplies, there are to be stands occupied by several foundry organizations which will stress educational and training facilities available to the youth of the industry and something of the researches currently being pursued. Naturally, the machinery and materials to be shown are those currently used by—or for future service in—the British foundry industry, which is believed to be the largest in Europe. The injection of the phrase: " or for future service " is very important, for we are aware that the veil of secrecy shrouding some new and quite revolutionary materials and designs of equipment and machinery is only due to be torn aside when the show opens. Although it is generally recognized that the best of Britain's foundries are equal to the best in the world, the average visitor from overseas arrives here with a very tight time schedule. He carries a number of introductions to foundries but normally only has time to see one or two firms with which he has had business connections in the past—and which may or may not be related to his own interests. If, however, he is able to time his visit to coincide with the Bingley Hall show, he can ask about any exhibit which appeals to him " where can I see this plant in a foundry." As an appointment to view can often be arranged with a local foundry manager, the visitor thereby receives a fine appreciation of the performance of the equipment he is interested in and a good opinion of the maker's service potential. If an overseas visitor be favoured by an invitation to inspect the works of a manufacturer of foundry supplies—ingots, alloys, sands and facings, corebinders, fluxes or pig-iron—he will, we feel sure, be astounded at the research and control facilities which are available to ensure that the firm's products conform to the highest possible standards.

As the Bingley Hall exhibition is a down-to-earth affair and not a conference, no works visits *en masse* and but few social events are to be included in the general programme. Thus, formal contacts with visitors will be replaced by personal services rendered by the staffs manning the stands—which is in truth much more satisfactory. If overseas readers care to notify the Editor, in advance, of their intention to visit the exhibition, every effort will be made to see that they are properly received and their business interests attended to. For those arriving unheralded and for visitors from the UK, the JOURNAL's own stand will be available as a reception centre. Here, personnel well conversant with the industry will be available throughout the period of the exhibition to advise and give help.

International Committee's New President

Dr. Aldo Dacco, this year's president of the International Committee of Foundry Technical Associations, was born in Gaggiano, Milan. As a young man he devoted his time to the development of gas-engines and co-operated in the creation of the marine engine, Laros. This activity furthered his interest in chemical-physical problems and surface conditions of the metal alloys. With his experience in this field, he was able, in 1936, to found LIASA foundry and engineering works, which, from the first, specialized in the development and production of bearing bronzes and similar alloys. He studied the application of thin layers of these alloys which had a low-tin and high-lead content, and developed several zinc-, copper-, and aluminium-base alloys carrying out particular research on aluminium and lead bronzes. He also investigated the application of copper/lead alloys in the production of main and connecting-rod bearings for gas- and diesel-engines, and, in addition, surface treatment with lead-indium and lead-tin alloys electrolytically deposited in thin layers.

Dr. Dacco holds several Patents relating to various non-ferrous alloys and fabricating processes. He was appointed president of the *Associazione Italiana di Metallurgia* in 1947, when times were particularly difficult, and gave new life to the *Associazione*, of which he was a founder member. During his presidency, the *Associazione* created the revue *La Fonderia Italiana*, and the publication of *La Metallurgia Italiana* was renewed. National congresses were organized in Milan, Florence and Genoa, and international congresses in Venice and Florence. The Luigi Losana and Guido Donegani gold medal awards were created and have so far been presented to such world-famous scientists as Chaudron, Chipman, Hume-Rothery, Köster, Von Zeerleder, Frary and Panseri. Other meetings organized by the *Associazione* whilst Dr. Dacco was president, include the International Congress of Aluminium Electrochemistry and the "Corrosion Days" (Milan, 1953), and the International Foundry Congress (Florence, 1954). In 1956, Dr. Dacco received an honorary degree in chemistry from the University of Ferrara. He is an honorary member of the American Society for Metals, the *Société Française de Métallurgie* and is corresponding member of the Institute of Metals.

Forty Years Ago

The JOURNAL for March, 1919, contains quite a few interesting statements, such as: "Our effort culminated in the discharge during 15 successive days of more than 12,000 tons a day of shells from Sir Douglas Haig's artillery." Mention is also made in this issue of the launching of the scheme which resulted in the formation of the Cleveland Institute of Engineers, and of the forming of the English Electric Company, Limited, to take over the Dick Kerr concern.

Forthcoming Events

MARCH 2

Institute of British Foundrymen

Sheffield section:—"Modern Investment Castings," by D. H. Armitage, 7 p.m., at the College of Commerce and Technology, Pond Street.

Lancashire branch:—"Precision Costing," by R. G. Nicholas, 7 p.m., at the Midland Hotel, Manchester.

MARCH 3

Institute of Metals

South Wales local section:—"Effects of Vacancies and Other Point Defects in Metals," by Prof. A. H. Cottrell, B.SC., PH.D., 6.30 p.m., in the Department of Metallurgy, University College, Singleton Park, Swansea.

Institution of Production Engineers

Nottingham section:—Works visit to Shell oil refinery, Stanlow, commencing 8 a.m.

MARCH 5

Institute of British Foundrymen

Stoke-on-Trent section:—"Manufacture of Marine Propellers," by J. M. Langham, 7.30 p.m., at the Stipendiary Court Room, Town Hall, Hanley.

MARCH 6

Institute of British Foundrymen

Beds & Herts section:—"Men Only Dinner," at the Wilbury Hotel, Letchworth, 7 for 7.30 p.m.

Bristol and West of England branch:—"Study of Some Casting Defects, and Their Cures," by J. L. Francis, 7.30 p.m., at the Royal Hotel, Bristol.

Introducing the Author . . .

Mr. H. W. M. Hodges, whose article on prehistoric founding appears on the facing page, is at present lecturer in archaeological technology at the Institute of Archaeology, London University. His father a doctor and his mother a novelist, he was born in 1920, in a village in north Oxfordshire. For the first eight years of his life he was free to wander at will in such fascinating places as the workshops of wheelrights, blacksmiths and carpenters, and, of course, his father's dispensary. A more formal education followed at Kimbolton School and St. John's College, Cambridge. During the war, Mr. Hodges served, as an observer in the Air Arm of the Royal Navy, chiefly on Atlantic and Russian convoy duties. He was discharged a sick man at the end of the war, but after four years of indifferent health he took a diploma in Archaeology at London University. He was appointed assistant lecturer in archaeology at the Queen's University, Belfast in 1953, and to his present post in 1957.

Prehistoric Bronzefounding in the British Isles

*By H. W. M. Hodges**

It often comes as a surprise to people to learn that, by 1000 BC, there existed in the British Isles a group of craftsmen capable of turning out bronze castings of a quality not far short of those of the modern workshop. It is intended here to examine what is known of the early bronze-smiths and their methods, and especially to have a look at the tools of their trade and the work which they produced.

The discoveries of the extraction of copper from its ores, its casting, and the alloying of the metal with tin, were made in the Near East. By the beginning of the second millennium BC, sound bronze castings were already being made in Mesopotamia. From here the knowledge and practice spread slowly, first into Central Europe and then to the Western Seaboard. This slow diffusion can be traced from the Mediterranean into Hungary, where the Transylvanian copper ores were being exploited, thence to Austria, and so to France and the British Isles. Oddly enough. although the alloying of bronze was well understood, the first metal tools manufactured in any area were of copper, since copper ores were always more easily discovered than those of tin.

Stone Moulds

The first metal tools made in Britain were, for the same reason, of copper, and it is only in those regions rich in copper ores that one finds evidence of this early exploitation—namely in Ireland and Scotland. Unfortunately, no early copper mines have ever been discovered in the British Isles, but this is probably due to the later working of the same mines that has destroyed the evidence one might have hoped to have found. Nevertheless, there are a few objects that throw some light on the subject, namely, the moulds used for casting these early tools. These are most commonly simple open-moulds for casting axe-heads. The example illustrated in Fig. 1 is typical of these. Such mould blocks—which are generally of sandstone—frequently bear the impression for casting several axes, often of different sizes.

Introduction of Soapstone

Tools produced in such moulds were, naturally, of equal thickness as cast. The cutting edge had to be made, generally by hammering, sometimes with additional annealing, which also gave a more efficient blade; and the whole face was normally given a further polish with some abrasive, probably wet sand or a sandstone block. Even so, these tools can hardly have been satisfactory, for the thin sides must have cut into the axe-shafts and soon caused them to split. This defect was to a degree overcome by hammering the sides to produce flanges: but a more satisfactory solution was later found by casting such axes with larger flanges. This meant using a closed mould of two blocks of stone. In a similar manner, early copper knives were simple, flat affairs, and a more efficient tool could only be produced by casting a strengthening midrib in, again, a closed mould. For this purpose the smiths had to select a suitable medium, and—remembering that they still had one foot in the Stone Age— it is not surprising that they continued to use moulds of rock. Furthermore, they had to be fairly selective, for the stone had to be fine-grained, to give a good surface, and be able to resist the fairly high temperatures demanded by the casting process. In effect, these factors seem to have limited the choice to one of two classes of rock—fine-grained sandstones or soapstone. Indeed, soapstone was so suitable that it was traded for this purpose over wide areas. Most of the soapstone seems to have come from the west coast of Ireland, while moulds of this rock have been found in lowland Scotland and Yorkshire. In passing, it is interesting to notice that in Denmark, in the Bronze Age, soapstone was imported from the northern Scandinavian countries for the same purpose. Finally, these tools were

FIG. 1.—*Bronze Age open stone-mould for casting axeheads.*

(Courtesy, National Museum of Antiquities, Scotland)

* See facing page for particulars of the Author's career.

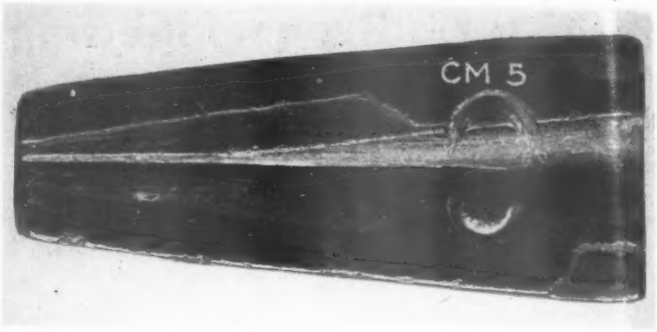


FIG. 2.—*Bronze Age soapstone cored mould.*

(Courtesy, National Museum of Antiquities, Scotland)

often decorated with a punched pattern, and it would seem that the only material at the smith's disposal hard enough to accomplish this would have been flint, previously flaked to a suitable edge.

This stage of development can be given a fairly firm date, for the graves in which this type of tool is found also often contain a blue faience bead of a distinct form that must have been imported from the Eastern Mediterranean, especially from Egypt, and was being manufactured there about 1500 BC.

Cored Moulds

For the next four centuries, the bronze industry in Britain developed very much "under its own steam," with little influence from outside. For the casting medium, the smiths continued to use the same rocks, and the only real technical innovation was the production of a socketed weapon in the form of a spearhead. This, of course, meant fitting a core to the closed mould, and such a core was probably of clay, although the possibility of a wooden core being used cannot be overlooked. The soapstone mould (Fig. 2) illustrated is typical of one of these. It will be noticed that two loops were provided on the socket—presumably for lashing the spearhead to its haft. These were semi-circular when cast, but in the finished form they were invariably flattened, as can be seen in the examples illustrated in Fig. 3. This seems to be one of those curious traditional ways of doing things which, although illogical, continue for a long time. These

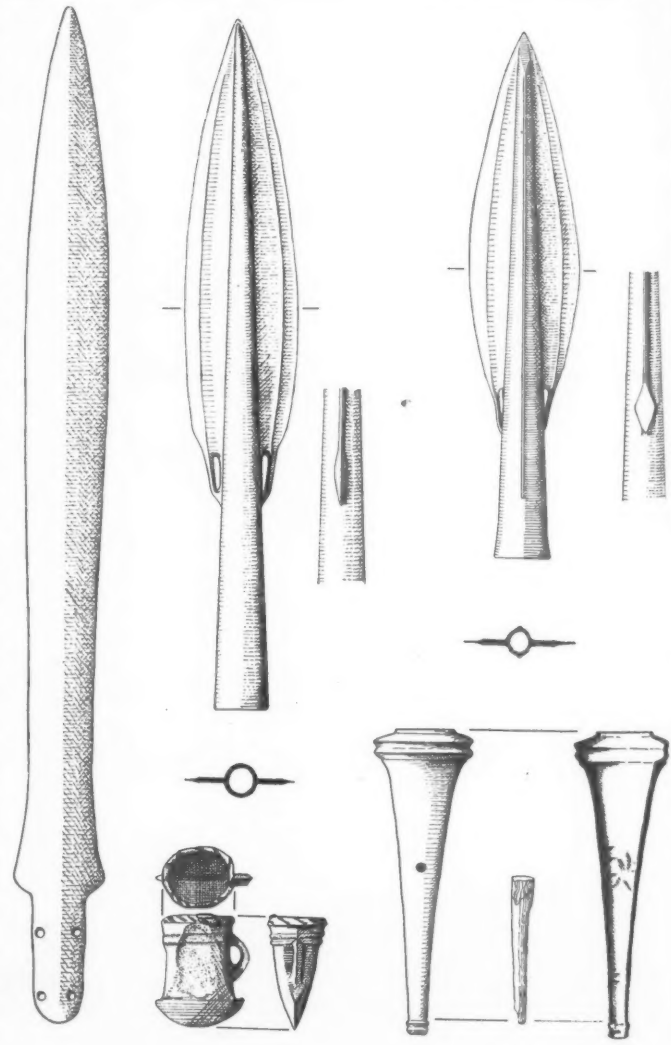


FIG. 3.—*Bronze implements recovered from the River Erne at Portora, Northern Ireland (about one-third actual size).*

(Courtesy, Ulster Journal of Archaeology)

(*Courtesy, National Museum of Antiquities, Scotland*)

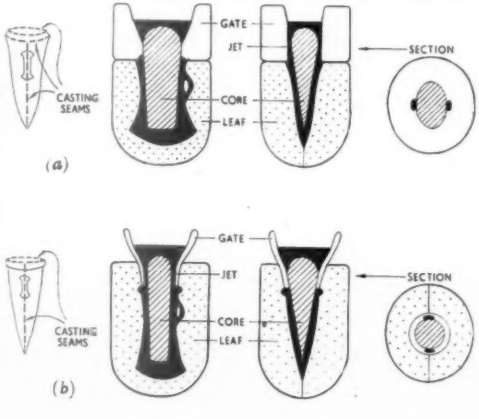
FIG. 4.—*Bronze Age two-piece sand-and-clay mould for socketed axeheads, from Jarlshof, Orkneys.*

loops were actually cast more or less in the flattened form only at the very end of the period.

Apart from this, the main developments of the period were in the design of tools on the one hand, and in the mastery over the technique of casting on the other. The earlier castings were generally small, and often of very poor quality, but in this period larger and really excellent castings were achieved; rapiers, sometimes 30-in. long, were made, for example, many of which were virtually flawless. The question that one cannot answer is exactly how these castings were produced. No workshop of this period has ever been discovered. For smelting and casting it is almost certain that charcoal was used, and probably some primitive form of skin bellows, for it is hard to see how the required temperatures could have been achieved otherwise. One might suggest the use of a simple furnace and crucibles for the casting process, but oddly enough, although such vessels should be most durable, crucibles of this early date are unknown. It has even been suggested that the smelt may have been puddled directly from the furnace into the mould. Above all, it must be remembered that this work was being done either in the open air or in the flimsiest of bivouacs, a factor which must have made the work incredibly hard to control.

FIG. 5.—*Working reconstruction of the types of mould used to cast socketed axeheads,* (a) *from Portora and* (b) *from Jarlshof.*

(*Courtesy, Ulster Journal of Archaeology*)



Although, as has been said, during this period Britain was somewhat isolated from the Continent, this did not prevent a small number of tools reaching other parts of Europe, and one typically-British spearhead has been found as far afield as Danzig in Poland; others from the Western Seaboard of Europe are not uncommon. But sometime shortly after 1000 BC Britain was to begin to feel the influence of one of those tribal upheavals that seem periodically to have convulsed the Continent. The immediate effect was to introduce new ideas and methods into the bronze industry of Britain with, of course, fresh designs and types of tools as an outcome.

Sand-and-Clay

The first radical change of this period was the gradual abandonment of the stone mould, with its replacement by one of clay. The remains of workshops where this work was carried out have been found in quite a number of sites in Scotland, Ireland and northern England, and throughout this area the fragments of moulds recovered show a remarkably uniform structure. The casting face was made of a well-washed clay, made into a grog with fine sand, supported by a very much thicker case of coarse sand and clay, often containing a great deal of vegetable matter. All such moulds were two-piece and were provided, when the need arose, with cores and sprue cups. A good example of such a mould is that from Jarlshof in the Orkneys (Fig. 4) made for casting socketed axeheads. This is very fragmentary, but enough survives to allow a working reconstruction (Fig. 5).

Bronze Age Patterns

To build such moulds, naturally, the smiths had to have a pattern from which to work. Very often, existing tools were used as patterns, but some were made of wood, for not only can the wood-grain derived from the mould-face be seen in some castings, but a group of such patterns was discovered in a bog in Ireland some 40 years ago (Fig. 6). There were certain practical difficulties about this method of making moulds. The pattern had to be removed before the clay was dry, otherwise the drying shrinkage would cause cracking. This was not a difficult matter with the smaller moulds, but for those intended to produce two-foot

swords it obviously gave trouble, and for this reason such moulds normally had a carefully trimmed rod of wood incorporated in the outer case. This made it just possible to remove the pattern without the mould collapsing.

This method of mould-building, of course, allowed a very much greater variety of tools and shapes to be produced, for the work involved in the making of a clay mould must have been very much less than that required to cut a stone one. Added to this, clay was readily obtained almost anywhere, and this allowed the itinerant smiths a greater mobility. Indeed, in the north and west of the British Isles most of the mould fragments have come from dwelling places, and it looks as though the craftsman moved about from one homestead to another making " bespoke " tools and weapons.

Mass-production Methods

In Wales and Midland and Southern England, however, another innovation appeared in this period. Hitherto there had been no very marked bronze industry here, for the somewhat obvious reason that copper ores were not obtainable in the region. However, scrap metal —in the form of worn-out and broken implements — became more and more common, and in course of time there grew up a trade in the collection of scrap, its re-casting as new tools, and their distribution. But unlike the smiths in Ireland and the North, these craftsmen seem to have gone in for something akin to " ready-made " or " mass production," often using bronze two-piece moulds for the casting of goods required in quantity. Again, unlike their colleagues in the North, they seem to have worked, not in homesteads, but in bivouacs, since their "hoards" of scrap metal and tools have always come to light, not in habitations of the period, but in places that cannot be connected with any archaelogical site.

Burning-on

The casting of bronze weapons in bronze moulds looks at first sight a pretty risky way of setting about things, as there was always the possibility of over-heating and so " running-on " or " burning-on " the new casting to the two parts of the mould. Indeed some writers have insisted that these bronze moulds were only used to produce wax patterns for working in lost wax. However, a critical study of the castings themselves makes it pretty clear that this was not the case. In fact, one of the bronze-smiths' chief difficulties must always have been under- rather than over-heating of the melt, and many long castings, such as swords, show a tell-tale lumpiness at the hilt—the last part to be run. It is no exaggeration to say that sooner or later nearly all these swords parted at the handle. When that happened—if the owner survived the calamity—one of two solutions was possible: either the whole

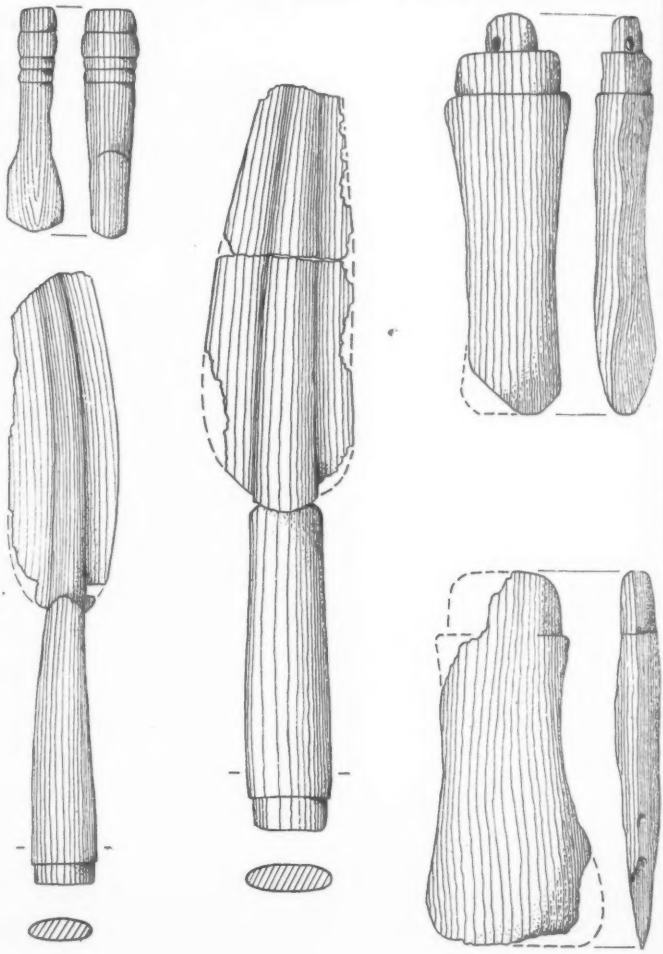


FIG. 6.—*Wooden patterns for bronze implements, from Tobermore, Co. Derry, (approximately one-third actual size).*

(Courtesy, Ulster Journal of Archaeology)

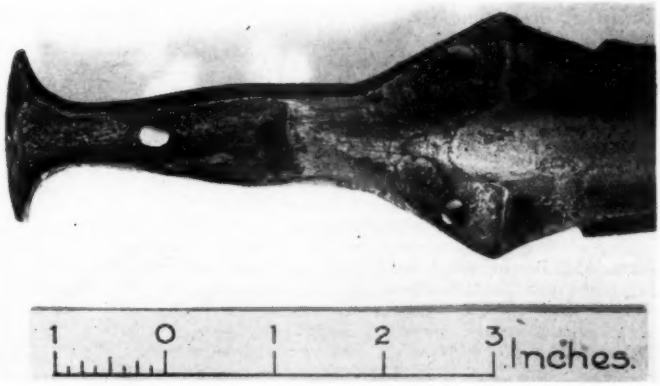


FIG. 7.—*Bronze Age example of "burning-on" for the repair of a sword-hilt.*

(Courtesy, National Museum of Antiquities, Scotland)

thing could be re-cast (or simply traded in as scrap) or a new handle could be run-on. An example of this kind of repair can be seen in the sword hilt illustrated in Fig. 7. The method adopted seems to have been to build up a small clay mould around the hilt and broken handle, and having removed the handle and dried the mould, to have poured the new casting straight on to the fracture without any preliminary running-through. It need hardly be said that such repairs were not always first-rate. This method was adopted widely in Ireland and the North and probably not at all in Midland and Southern England, where broken tools and weapons were traded-in as scrap—which again emphasizes the "bespoke" and "mass production" as distinct characteristics of the craftsmen in the two areas.

Other Applications

Burning-on was not only used for the repair of implements. During this period, the use of bronze cauldrons came into vogue. These were made of riveted sheet bronze and were supported by a pair of free-moving ring handles held to the rim of the vessel by staples. In Ireland and Scotland these staples were always cast directly on to the rim (Fig. 8). This, again, must have been a fairly tricky process, for not only had a clay mould to be built up to fit snugly around the rim, but also the sheet metal was so thin that there must have been a very real danger of the rim collapsing under the heat of the new casting. Just as they seem not to have made burn-on repairs, the smiths in Midland and Southern England seem to have been ignorant of, or to have fought shy of this method of fixing the cauldron ring-staples, for in these areas the staples were almost invariably pre-cast and riveted to the rim.

Working under difficult conditions, it is remarkable what these early craftsmen achieved, but being human they also had their bad days and made their quota of mistakes. Unfortunately, their worst efforts are not usually on display in museums, where the policy is normally to show only the finest work. This is a pity because one can often learn more from the first attempts than from the finished product. Hidden away in the drawers of most museums one may sometimes find a sorry bunch of castings, with misplaced cores, enormous flashes where the mould pieces have parted during pouring, and incomplete castings—short runs—where the melt quantity had been misjudged or had gone cold. Equally interesting is the personal factor that enters into the picture. In the hoards of some of the bronzesmiths, the high quality of the castings is really incredible, every piece being virtually flawless, while in other cases there may be not a sound casting out of nearly a hundred, and one is left wondering if the Bronze Age may not have had its "cheap jacks," too.

The fate of this industry, like that of so many recent ones, was partly decided by the discovery

FIG. 8.—*Bronze Age cauldron constructed of riveted sheet metal, with the handle cast-on afterwards.*

(Courtesy, National Museum of Antiquities, Scotland)

Prehistoric Bronzefounding

of a new material, in this case, iron. Iron ores were more widespread, just as easily worked and smelted, and provided better tools. The first such tools seem to have been imported into Britain around 500 BC. Two centuries later it is unlikely that any bronze was being used for this purpose. Even so, for ornaments, dress-pins, and so on there remained a small and steady demand, through the various vicissitudes of the Roman, Saxon and Viking invasions, and so to medieval and modern times. Bronzefounding in Britain has indeed a long unbroken history.

Foundry Exhibition

This week's leading article contains an invitation to foundrymen to participate in the UK Foundry Exhibition, which is to be held in Bingley Hall, Broad Street, Birmingham, from May 21 to 30. The exhibition will not be open to the general public, admission being by ticket (obtainable in advance from stand-holders) or by trade card. The opening hours are 10 a.m. to 6 p.m. daily, excepting Sunday. Restaurant and bar facilities, etc., will be available inside the exhibition.

This JOURNAL will shortly be publishing final lists of firms taking space, as well as a map and much other advance information about the exhibition. Then, early in May, a special issue of the JOURNAL will embody the official exhibition catalogue, with details of every stand, in addition to editorial comment and reports on the various phases of the post-war foundry industry of the United Kingdom, written by specialists in their field. This extra JOURNAL will be mailed to all registered subscribers at home and abroad and will present the full story of the exhibition for those who are unfortunately prevented from attending personally. Further copies of the special JOURNAL will be available at the exhibition, in which the catalogue section will be interleaved with plain sheets for note-taking—a spiral binding permitting convenient folding back.

During the run of the exhibition, the JOURNAL's own stand—No. 66—will be manned continuously to deal with visitors' enquiries.—All foundrymen will be welcome!

Association of Bronze and Brass Founders

Arrangements have been made for a party of members of the London and Home Counties area of the Association of Brass and Bronze Founders to visit the Thames Foundry of the Ford Motor Company, Limited, on Tuesday, May 12. The journey to the foundry is to be made by launch, luncheon being served on board. The cost of the trip will be approximately 35s. per head. Those wishing to participate should make immediate application to the secretaries, Heathcote and Coleman, 69, Harborne Road, Edgbaston, Birmingham, 15.

Mr. D. C. LORKIN, managing director of the Lancashire Dynamo group presented 15 long-service awards to employees of Dynamo & Motor Repairs, Limited, at a luncheon held recently at Wembley Park.

British and World Shipbuilding

Lloyd's Register Returns for December Quarter

Steamships and motorships under construction in Great Britain and Northern Ireland at the end of December totalled 310 ships of 2,234,158 tons gross, a decrease of 64,975 tons compared with the previous quarter, states Lloyd's Register of shipbuilding returns relating to merchant ships of 100 tons gross and upwards. Some 58 ships of 362,180 tons were commenced, 75 of 390,127 tons launched, and 67 of 440,865 tons completed. The vessels under construction included 75 steamships of 1,109,475 tons and 243 motorships of 1,124,683 tons.

In other British Commonwealth countries there were under construction nine steamships of 90,720 tons and 44 motorships of 113,830 tons. Oil tankers building in Great Britain and Northern Ireland totalled 71 ships of 1,064,195 tons, a decrease of 86,376 tons compared with the previous quarter, and representing 47.6 per cent. of the total tonnage under construction in this country.

Vessels building in the world, excluding China and Russia, numbered 1,442 of 10,002,846 tons compared with 1,563 of 10,205,791 tons in the previous quarter. The total included 286 steamers of 4,953,060 tons and 1,156 motorships of 5,049,786 tons. Construction in hand in the principal districts of Great Britain and Northern Ireland is indicated in Table 1.

TABLE 1.—*Shipbuilding Construction in Hand in Principal Districts of Great Britain and Northern Ireland.*

District.	December 31, 1958.		September 30, 1958.		December 31, 1957.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	14	21,490	16	31,206	16	22,879
Barrow ..	2	67,500	3	94,500	3	88,140
Belfast	16	296,780	17	305,740	19	303,055
Bristol	2	4,850	3	6,200	3	1,080
Clyde:						
Glasgow ..	65	517,659	68	529,475	72	456,296
Greenock ..	29	193,910	30	178,280	28	181,048
Dundee.. ..	5	43,100	5	40,300	7	47,300
Hartlepool ..	5	36,240	6	44,840	8	65,560
Hull	39	16,642	37	17,182	30	18,446
Leith	10	49,000	11	57,350	13	66,540
Liverpool ..	11	112,053	13	124,719	16	156,168
Middlesbrough..	15	194,164	15	187,679	16	198,278
Newcastle-upon-Tyne ..	36	423,032	40	414,334	41	446,480
Southampton ..	8	8,178	8	3,469	9	6,650
Sunderland ..	24	225,050	27	240,056	32	259,108

The sizes of steamships and motorships (in parentheses) under construction in Great Britain and Northern Ireland included the following: 100 to 500 tons, 4 steam (76 motor); 500 to 1,000 tons, 5 steam (22); 1,000 to 2,000 tons, steam, nil (20); 2,000 to 4,000 tons, 2 steam (12); 4,000 to 6,000 tons, 2 steam (16); 6,000 to 8,000 tons, 2 steam (20); 8,000 to 10,000 tons, 4 steam (35); 10,000 to 15,000 tons, 17 steam (38); 15,000 to 20,000 tons, 1 steam (nil); 20,000 to 25,000 tons, 15 steam (4); 25,000 to 30,000 tons, 6 steam (nil); 30,000 to 40,000 tons, 6 steam (nil); 40,000 tons and above, 3 steam (nil).

Of the steam and motor merchant ships under construction throughout the world at the end of December, 5,612,856 tons (56.1 per cent.) are under the inspection of Lloyd's Register. Of this total 2,175,008 tons representing 97.4 per cent. of the tonnage being built there, are under construction in Great Britain and Northern Ireland; while, of the tonnage being built abroad, 3,437,828 tons (44.3 per cent.) are to be classed with Lloyd's Register.

Tumbling and Blasting with Organic Media

By L. C. Barton

The processing of parts in rotating barrels to remove burrs and/or modify the surface finish has of late years developed along many varying lines. Most of these have involved "wet" barrelling techniques, using a particulate abrasive in conjunction with pebbles or chips, but recent developments have demonstrated that there is still a field for "dry" techniques making use of naturally-occurring, mildly-abrasive organic wastes. Of these, black walnut-shell has proved valuable because of its ease of grading and good cutting action when fragmented, both in standard tumbling processes and in centrifugal or air-blasting methods of burr removal.

Of recent years, there has been much interest in the barrel finishing of die-cast components, and a steady increase in the application of this technique to both light-alloy and zinc-base die-castings. A number of barrelling methods are currently in use, ranging from the long-used ball-burnishing technique to the quite recently introduced processes which utilize standard shapes of extruded ceramic or synthetic abrasives. Between these lie the widely-used barrelling methods using natural products such as limestone and granite chippings.

In addition to barrel finishing proper, which may be defined as including all methods in which the work and cutting-down media are rolled together in a rotating container, there are related techniques in which the work is vibrated (with or without rotation) or is held stationary, while immersed in an abrasive slurry, the vessel containing the slurry being rotated about a vertical axis. Despite superficial variations, all these methods derive ultimately from the "rumbling" or "tumbling" process, as applied for the best part of a century to cast-iron components and, to a lesser extent, sand-cast brass-parts.

Processing of Iron and Brass Castings

In the processing of cast-iron parts, rumbling is performed dry; the rubbing together of the parts removes adherent sand and reduces surface asperities. The barrels used are often constructed of perforated plates so that sand and metal chips removed from the castings can fall away. This is not always so, however, and when rumbling small castings the detritus, when retained, forms a crude abrasive medium and promotes a good surface-finish on the components. In the tumbling of brass castings, although reliance is placed upon the rubbing together of the articles to reduce sharp corners and edges, a course emery grit is normally added to produce a smoother surface.

For both iron and brass castings, the process is frequently carried out dry, whereas in the newer barrelling techniques currently applied to die-castings—which have developed from the wet burnishing processes utilizing steel balls and not directly from rumbling practice—a detergent liquid is commonly used, in conjunction with the abrasive medium. Dry tumbling is, however, widely applied for the removal of thin and brittle flash from thermo-setting plastics articles, and, even in the field of metal finishing, is still used to a certain extent. It has, in fact, some minor but very real advantages when compared with the wet-tumbling techniques.

Wet Tumbling

Wet tumbling, it should be stressed at the outset, is a faster operation; a coarser abrasive can be used and a greater weight of metal removed in unit time. However, this faster action results in the surface being cut-down to a greater degree than is always desirable (especially when the primary purpose of the operation is merely deburring), and results in a darkening of the finish unless a subsequent burnishing tumble is adopted. Dry tumbling is not primarily a deburring process, and indeed is most successfully applied to die-cast components that have been cleanly and closely shaved in a trimming die. Its slower, lighter action produces results more nearly comparable with wheel-polishing, buffing or colouring, according to the type of carrier used and the duration of treatment.

Carriers

The carrier is the shredded or pelleted material used to keep the components from bruising one another it serves also to pick up and apply the abrasive medium where one is used. Some carriers, however, like walnut-shell and maize-cob, have themselves a mild abrasive action and can be used alone. Of the primarily non-abrasive carriers, sawdust, felt clippings, cork chips, leather cuttings and punchings, rawhide clippings and "vegetable ivory" (a Phytelephas nut) have been widely used, and many other organic waste-materials of adequate bulk can be satisfactorily utilized when available. In addition, wooden pegs and "shapes," analogous to the steel "shapes" used in ball-burnishing, are used to some extent in the dry tumbling of light

alloys. Wooden pegs are also, of course, used in tumbling plastics articles, though their function is then to remove flash rather than to burnish.

Various other pre-shaped materials such as casein rod sheared diagonally into pellets, and felt slugs previously rolled in an adhesive and then coated with emery, have been used experimentally for dry tumbling with varying success. The essential pre-requisites for a good carrier are (*1*) a surface which retains the abrasive particles so that they remain *in situ* and do not roll between carrier and component to be treated, and (*2*) a relatively small surface : volume ratio so that a small addition of abrasive is effective. On this second point, it will be appreciated that if material of, say, a flock-like character is used as a carrier, a great deal of abrasive is occluded amongst the fibres and is never brought effectively to bear up on the work. There are, as a matter of fact, other reasons for not using fibrous materials; their tendency to ball-up is perhaps the most important. However, any carrier of a hollow or tubular nature, and even some cup-like husks, are not well-suited for use as carriers because so much of the actual surface is never brought to bear upon the work.

Speeds

Slow tumbling in large barrels gives best results when operating the dry process; barrels up to 4 ft. long by 2 ft. 6 in. across flats, rotating at 12 to 15 r.p.m., are representative of common practice. Some companies prefer larger-diameter but narrower barrels; these being mainly for treating very small components. The larger the barrel diameter, the deeper the charge of carrier and components which can lie within it, for whatever size of barrel is used the normal charge is to within an inch of so of the axial centre-line. In a large-diameter but short barrel, therefore, the pressure exerted upon the lowest layers as the superincumbent work overrides them is greater than in a longer, smaller-diameter barrel of the same capacity. Accordingly, for a given grit size, the cutting-down of the surface is more severe.

Dry tumbling sequences are invariably more protracted than are corresponding "wet" operations. Twelve-hour "tumbles" are quite commonly required, and in some cases much longer duration of processing—24 or 30 hours—is needed to develop a really smooth and dull lustrous surface. It will be evident, therefore, that for a given throughput the number of barrels in use must exceed by a factor of five or six those needed for wet processing, assuming that the latter operate through a 24-hour day (as is not always the case). Under conditions of intermittent operation (for the wet process) the needs are less disparate, since most jobs can be left to run through the night without specific attention.

Working Conditions

The labour required is, of course, not related at all to the number of barrels in use, but only to the number of times per day that unloading and loading must take place—that is, for a given throughput the labour requirement is substantially identical for wet and dry tumbling. Operating conditions for labour engaged in barrel tending are on the whole superior when the dry process is in use, because floors, bins and tote-pans are free from wet abrasive and alkaline solutions.

Some proprietary "wet" methods, it is true, do not entail working on a wet floor if care is taken when loading and unloading, but by and large there is considerable spillage in handling wet castings and treatment media. In practice, many companies operating dry-tumbling sequences find it advantageous to finish with a wet ball-burnishing operation, using a soap solution and, of course, no abrasive, to impart a high lustre to the die-castings. Unless the parts are to be plated immediately, burnishing must be followed by a hot rinse and, preferably, drying in a forced air-current to avoid darkening of the surface.

Use of Walnut-shell

Although, as noted earlier, dry-tumbling methods are not intended to replace trimming for the removal of major flash, the use of organic wastes such as corn-cob and walnut-shell has recently proved surprisingly effective for de-burring in some US plants, using air-blast and "Wheelabrator" equipment. Of the various organic abrasives, crushed black walnut-shell has been found the most effective. It has good intrinsic abrasiveness, resilience and toughness, and in use continues to fracture cleanly and so present fresh, sharp edges to the castings.

A particularly important application of this technique has been for the removal of burrs from the very large torque-converter, and other transmission elements, now being die-cast in aluminium alloys. These are characterized by their deep and elaborately cored recesses, with intersecting bores at which fray occurs. By using graded walnut-shell, internal burrs are so cleanly removed that no hand-work as a separate operation is called for. In the small proportion of cases where a fragment of flash is still adherent, it is removed by an inspector when plug-gauging the component.

Because of its low density, walnut-shell has no peening effect upon the surfaces of die-castings, the finish of which is substantially unaltered by blasting. Only the burrs, which collapse and are carried away under the impact of the shell fragments, are affected by the operation. Other complex die-castings, such as carburettors and distributor bodies—both cast in zinc-base alloys—are also being successfully deburred by dry-blasting with walnut-shell, again without any modification of the superlative as-cast surface finish. The quickly increasing use of this clean and lightweight organic abrasive is being materially facilitated by the introduction, by US manufacturers, of blasting and centrifugal-type equipment especially designed to give optimum results with crushed shell.

Taxation of Payments made for using Patents

By "Barrister-at-Law"

Payments made to the owner of a Patent, for the right to make use of his Patent, may take one of two forms. It might consist of a lump sum payment, or on the other hand, instalment payments spread over a number of years.

Prior to the changes principally introduced by the Income Tax Act, 1945, recourse was had to the method of lump sum payments, in the hope and expectation that the payment would be treated as one of a capital nature, so that the recipient would not be liable to pay tax thereon. Where the payments were to be made in instalments at periodic intervals, then the payments would usually be of an income, and not of a capital nature, so that it would constitute part of the taxable income of the recipient.

The distinction between these two methods of payment has lost much of its practical importance since the 1945 Act, and even a lump sum payment is now treated as an income payment, though in a somewhat unusual manner. That is not to say, however, that a lump sum payment may not be of a capital nature and accordingly not liable to tax in the hands of the recipient. Thus, if an owner of a patent were to completely dispose of his rights in the Patent, so that no interest in it would revert to him at some later date, it might be said that he had thereby realized a capital asset, and that the payment he received for its transfer was a capital receipt. The tax position with regard to both payments and receipts for the right to use a Patent will now be considered.

Lump Sum Payments

The changes which were introduced by the 1945 Act were intended to benefit industry, and to enable manufacturers and industrialists to equip factories with new and improved plant and machinery. Tax relief for the acquisition of Patent rights was accordingly conferred. Where a lump sum payment was made for the acquisition of Patent rights, the person making the payment, while not being entitled to deduct the payment as a trading expense, was granted an annual allowance in respect of the payments. This allowance was spread over a number of years, the number being determined by a method which will be demonstrated later in this article.

However, the lump sum payment was not treated as an immediate income receipt in the hands of the recipient; the recipient was allowed to elect to have the payment spread over a number of years, the appropriate position of the receipt for each year being treated as part of his income for that year.

Purchaser's Position

The sum paid out by the purchaser of the Patent rights was to be spread over 17 years, assuming of course, that the period of the grant of the rights was at least 17 years. If it was less, then the spread-over would be for an appropriately shorter period.

Example

In 1958 A pays £3,400 for Patent rights which he is entitled to use for more than 17 years. He will be entitled to deduct as a trading expense 1/17th of £3,400, *i.e.* £200, for each of the 17 years commencing with the year 1958. If the duration of the Patent rights was for, say, 10 years, then the deduction would be 1/10th of £3,400, *i.e.* £340, for each of the 10 years commencing with the year 1958.

Recipient's Position

The fact that the payment is a lump sum will not prevent it from being an income receipt. The recipient, or owner of the rights, is entitled to have the sum received split up into six equal parts and spread over six years, beginning with the year in which it has been received, although he *may* elect to have the whole sum assessed as part of his income for the year in which it was received.

Example

In 1958 A confers a licence to use his Patents and receives £3,600 for the transfer of such right. The sum of £3,600 will be treated as if it were a sum of £600 received by him, *as income*, in each of the six years beginning with the year 1958. He may, however, elect to be assessed in respect of the whole sum of £3,600 for the year of assessment in which it has been received by him, *i.e.*, 1958.

Sale of UK Patent by Non-resident

Special rules apply when a UK Patent is disposed of by an owner who is not resident in the UK. In order to ensure payment of the tax to the Revenue, the purchaser of the rights, making a lump sum payment, is required to deduct tax at the standard rate from the amount when making the payment. The purchaser is under an obligation to make this deduction, and can be called upon to pay the tax out of his own pocket if he fails to do so. However, the non-resident receiving the payment is entitled to the same benefits as above regarding the sum he receives. The sum may be spread over a period of six years, and the appropriate 1/6th proportion of the payment treated as part of the recipient's income for each of the six years in question. A non-resident who desires to have the payment apportioned in this way must,

Taxation of Payments for Patents

however, give notice to that effect to the Commissioners within 12 months after the end of the year of assessment in which the payment has been received by him.

Intervening Transactions

Patent rights may have changed hands more than once. The original purchaser may have sold them to someone else, who may have resold, and so on. In such cases adjustments are made to prevent the same payment being rendered liable to tax more than once. Each person who has bought and then resold the rights will not be treated as having received the whole sum paid to him on the resale. He will be taxable only in respect of the difference between the price at which he purchased and the price at which he resold.

Example

If A purchases the rights for £2,200 and later resells them for £3,400 he will be taxed on the difference of £3,400 – £2,200 = £1,200, and this latter sum will be spread over the period of six years.

Royalty Payments

So far, lump sum payments only have been dealt with. The position with regard to royalty payments, made annually, will now be examined. The person making such a payment must deduct tax from it and pay over only the balance. The payer will not be liable to account for the tax deducted if he has taxable income of a sufficient amount on which he himself is liable to tax, in other words, if he makes the payment out of " profits and gains brought into charge." If, however, he has insufficient chargeable income of his own, then he must account to the Revenue for the tax he has deducted from the royalty.

The recipient will be entitled, at his option, to have the amount of the royalty spread over six years. The spread-over in this case, however, is not over future years, *but over past years.* In other words, the apportionment of the royalty will be made not forwards, but backwards, and adjustment of his tax liability for past years may become necessary.

Conclusion

These rules with regard to the taxation of payments for Patents apply to companies, as well as to individuals, whether the company happens to be the payer, or the recipient.

British Aluminium Board Changes

Following the acquisition of over 90 per cent. of the equity of the British Aluminium Company, Limited, by Tube Investments, Limited, and Reynolds Metals of America, British Aluminium's chairman and deputy chairman, Lord Portal and Mr. Geoffrey Cunliffe, have left the boards of the company and of all its associated and subsidiary companies.

Sir Ivan Stedeford, chairman of TI, has been elected a director and chairman of British Aluminium and Mr. Richard S. Reynolds, chairman of Reynolds Metals, has also been elected to the board.

Lord Portal became a director of British Aluminium in 1951 on relinquishing the post of Controller of Atomic Energy and he was elected chairman the following year. He is also chairman of Lochaber Power Company, and a director of Barclays Bank, Limited, and Barclays Bank DCO. Mr. Cunliffe has been on the British Aluminium board since before the war and deputy chairman since 1947, and has been closely associated with the aluminium industry, not only commercially but through the Aluminium Development Association and the Aluminium Industry Council.

It was announced last week that the 13½ per cent. dividend conditionally proposed by British Aluminium in respect of 1958 while the take-over struggle was still in progress and the retention of which by stockholders was one of the terms of the improved TI offer, has been declared as a further interim payment. Those who accepted the TI offer will receive this payment on May 1. The dividend is payable to all ordinary stockholders registered on February 24.

It is not intended to declare any final ordinary dividend in respect of 1958 and it is emphasized that the present payment should not be taken as an indication of the probable future level of ordinary dividends.

English Electric Successes

One-for-two scrip issue is proposed to those registered on April 30 by the English Electric Company, Limited. After the annual meeting on March 19, an extra-ordinary meeting will consider increasing the authorized capital to £35,000,000 and the capitalization of £10,046,335 of the share premium account. Group profits are £10,155,247 (£9,737,563) and after tax, etc., there is £3,017,258 (£2,951,285) attributable to the holding company. The 10 per cent. final dividend makes 14 per cent. for the year to December 27, 1958.

A member of the English Electric group, Vulcan Foundry, Limited, converted a group loss of £286,497 into a profit before tax, of £125,780 in 1958. Depreciation charged was £118,780 (£76,408) and UK tax takes £50,000 (£2,000), leaving a balance of £50,780, compared with £26,503 for 1957, when subvention payments of £335,000 were made by the parent company to cover loses. Dividends are resumed on the ordinary with a 5 per cent. recommendation. Previous payment was 10 per cent. for 1956.

D. Napier & Son, Limited, aero and marine engineers, etc., of London, W.3, another member of the group, maintained profits in 1958 and the dividend is repeated at 7½ per cent. The net profit is £94,548 (£91,327). Also in the group is Marconi's Wireless Telegraph Company, Limited, the consolidated profits of which amounted to £1,028,519 (£1,107,112). The dividend is repeated at 10 per cent. and £250,000 is again placed to general reserve.

A slight drop is shown in the net profits of the Marconi International Marine Communication Company, Limited, from £240,767 to £222,039. A 6 per cent. final dividend repeats 10 per cent. for the year and £135,000 (£150,000) goes to general reserve.

CANADIAN VICKERS, LIMITED—Major-General A. E. Walford has been elected chairman of the board.

MARL FOUNDRY COMPANY, LIMITED, is planning to extend the foundry in Whitehall Road, West Bromwich.

Camel Corps Monument

Probably few people are aware that there is a memorial to the Imperial Camel Corps in the Victoria Embankment Gardens, London (just to the east of Charing Cross Underground station). The casting was made at the Thames Ditton foundry of A. B. Burton, sculpted by Cecil Brown, and erected in 1921. As can be seen from the illustration it is a dainty little statue, which has taken on a highly polished finish as a result of loving care bestowed on it by the London County Council park attendants, who regularly apply ordinary

furniture polish. It is said that this practice was started by an attendant who was himself a veteran of the Corps and who naturally held the monument in high esteem. On the reverse side of the plinth is a plaque commemorating the battles in which the Corps was concerned.

Hawker Siddeley Expanding Australian Interests

By the formation of a new holding company, Hawker Siddeley Australia Pty., Limited, the Hawker Siddeley Group, Limited, is expanding its organization in Australia. The company will manage all the group activities except aircraft.

Sir Roy Dobson, managing director of the group, said on February 16: "We believe that much of our future efforts must be devoted to increasing our business in the countries of the Commonwealth. We have already achieved considerable success in Canada and we believe that we have a bright future also in Australia and New Zealand."

Mr. W. S. Warner, a director of Hawker Siddeley Industries, Limited, will be the new company's first chairman and Mr. James S. Samson, deputy chairman and managing director.

FBI Survey of Industrial Trends

Judging by an analysis of the fourth inquiry into industrial trends made by the Federation of British Industries, it would appear that industry is taking a slightly more optimistic but still cautious view of business prospects. The inquiries are held every four months and the last one, which brings the survey into its second year, shows that for the first time since they began, more firms reported improvements in output and new orders than declines.

The analysis is based on 675 replies received from chairmen and managing directors of firms chosen to be broadly representative both of the different industries and the proportions of large and small firms which make up British manufacturing industry.

The third inquiry taken last October showed a balance of opinion about the future changed for the better and, although the improvement is slight, the fourth inquiry shows it to have been maintained. Although home deliveries and new orders are up, employment and hours worked have fallen, new export orders and deliveries are down and orderbooks in general have continued to shrink.

General Outlook

Costs per unit of output are still rising, with profit margins and selling prices both down. Stocks of work in progress and finished goods have risen, but stocks of raw materials have continued to fall. The great majority of firms report that they will be authorizing less capital expenditure this year on buildings, plant, and machinery.

An improvement is expected in export orders and output in the next four months, but there is no expectation of a rise in prices and profits—the reverse is more likely to be the case—nor in stocks, employment, or average hours worked.

Within the industrial groups there are no great divergences from the average trends over the past four months, but the predominant metals group shows less favourable trends and in contrast the vehicle group shows trends materially better than the average.

F. Perkins' Future Prospects

Addressing employees at the Peterborough factory of F. Perkins, Limited, diesel-engine manufacturers, last week, Mr. Albert A. Thornbrough, president of Massey-Ferguson, Limited, which recently made a successful bid for the capital of F. Perkins, said that although Massey-Ferguson was the largest seller of tractors and combines in the world, in no plant was an engine made.

"Our present requirement is something twice your current schedule. I think that should give you some assurance as Perkins will be the engine-manufacturing source for Massey-Ferguson," he said.

Several changes in the board are announced by F. Perkins following the take-over by Massey-Ferguson (Holdings). Mr. Frank Perkins, who has resigned his office of joint managing director, remains chairman, and Mr. M. I. Prichard, joint managing director, has been appointed managing director. Col. W. E. Phillips, chairman and chief executive officer of Massey-Ferguson, Limited, Toronto, and Mr. Albert A. Thornbrough, president of Massey-Ferguson, Limited, Toronto, became directors following the resignation of Sir Richard Yeabsley and Mr. G. P. Ritchie.

Equipment and Supplies

Non-ferrous Melting Furnace

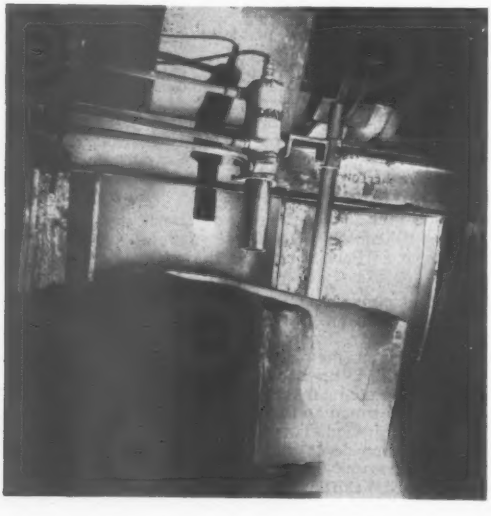
Hedin, Limited, Commerce Estate, South Woodford, London, E.18, have produced a range of electric-resistance melting furnaces, designed for the alloying of non-ferrous metals in quantities of up to approximately 100 lb. Typical of the range is a lift-out crucible type which will melt 50 lb. per charge. It is rated at 14 kw. and has a temperature range up to 1,400 deg. C. Artificial atmosphere inlets are provided to prevent oxidation during the melting cycle, and the atmosphere may be piped from a gas generator or from cylinders. Accurate temperature control is claimed, and maintenance involves only an occasional change of elements, which is done without in any way disturbing the construction of the furnace. The elements are of the silicon-carbide type.

The furnaces are built in various sizes, to melt 10, 15, 30, 45, 60, 75, 90 and 110 lb. respectively. They are all designed to take standard crucibles, and larger furnaces can be built if required.

Radiation Pyrometer

A radiation pyrometer, designed to give close control of molten-metal temperatures, has been introduced by Land Pyrometers, Limited, 318, Queens Road, Sheffield, 2. Known as the R.P.18, the pyrometer measures the temperature of the metal, as it leaves the cupola or holding furnace, with an accuracy comparable with that of an immersion pyrometer. By using a photocell instead of a thermopile, the manufacturers claim to have eliminated the serious effect of metal emissivity on the accuracy of the reading. A target as small as 1 sq. in. can be focused upon so it is easy to sight the pyrometer on the metal stream in the spout (see Fig. 1). The pyrometer lens is protected by a window of heat-resisting glass, which can be easily cleaned, or replaced, if accidentally splashed with metal. A water jacket is supplied with the instrument in order to keep the temperature of the photocell below 40 deg. C. Another integral part of the equipment is the air-purge unit, which enables an air jet to be blown down the optical path to keep it free from fumes, also helping to protect the pyrometer window.

FIG. 1.—*Radiation pyrometer, by Land Pyrometers, Limited, shown focused on the metal stream as it issues from a receiver.*



Electronic Strip-chart Recorder

George Kent, Limited, of Luton, Bedfordshire, announce the addition of the Mark 3 Multelec high-speed electronic strip-chart indicator-recorder (hitherto confined to nuclear-energy and other special applications) to their range of industrial instrumentation. It is at present available for the precision measurement of millivoltage, and of temperature, and for use in association with thermocouple, resistance thermometer or radiation pyrometer. It may be obtained in single or multi-point form, with point-cycle times of 5, 10 or 20 sec., depending on application, enabling up to 16 variables consecutively to be measured and recorded with laboratory accuracy.

Double-sided Adhesive Tape

The fixing of small nameplates for use on machines, products, and on goods in transit, can be facilitated by a new double-sided adhesive tape called "Twinstik," made by Evode, Limited. The plates, manufactured by the Metal Gravure Company, Limited, Knolly's Road, Streatham, London, S.W.16, are backed by the adhesive tape, which is protected by a specially-treated paper. This protective cover is stripped off to expose the other pressure-sensitive surface and the plate is then pressed into position. The main advantage claimed for this method is a saving in time compared with older methods of riveting or screwing on the plates.

Elapsed-time Indicator

Cass & Phillip, Limited, Mark Road, Adeyfield, Hemel Hempstead, Herts, have adapted the design of their elapsed-time indicator to make it a completely sealed, insulated and waterproof unit. This instrument registers the true operating hours of a vehicle or a machine. In foundries—in addition to use on trucks, etc.—these clocks may be used on moulding machines, and in many cases where "down time" is important, both in permanent use and for time-study applications.

Shell Coreblower

The Coleman-Wallwork Company, Limited, Stotfold, Bedfordshire, have now concluded arrangements with the Shalco Corporation, USA, for the manufacture in England and sale in Europe and Commonwealth countries of the Shalco high-production shell coreblowers. A number of machines have been already built in the UK and are now in production. The general description of the machine was previously recorded in this JOURNAL (see July 14, 1955 issue) and the British-built counterpart (Fig. 2) follows much the same basic construction except that great attention has been applied to detail and ruggedness to stand up to foundry conditions. Practically all designs of corebox can be accommodated on the machine. It is claimed that a normal operational cycle occupies 30 to 50 seconds; that corebox changing is easy, and that the sand container can be recharged during the cycle. One of these machines was recently inspected by the JOURNAL'S representative and appeared to be operating extremely efficiently to produce a 4-in. dia. pipe-bend shell-core from a very substantial aluminium corebox. The maximum corebox size that can be accommodated is at present 12 by 15 by 30 in., though larger-still

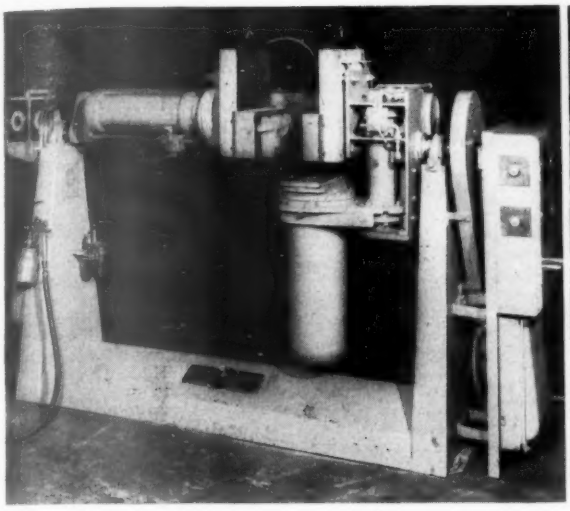


FIG. 2.—*General frontal view of the Coleman-Wallwork MCM.5 coreblower, showing the built-in timing-gear and switches (right) and electric heater controls (left). The design permits a wide variation in corebox sizes.*

FIG. 3.—*Miscellaneous collection of cores in various sizes and degree of intricacy produced from single-impression and multiple-impression coreboxes on the Shalco machine.*

models of the machine are envisaged. To get the best out of shell coremaking machines of this type, it is recommended that special attention be paid to corebox design. The Coleman-Wallwork Company has built up an advisory service in this respect which naturally is at the disposal of machine users. A range of typical cores produced by the machine is shown in Fig. 3.

Portable Grinder

A portable grinder (LSR 81), claimed to have 75 per cent. more power than previous tools of similar size, is now being introduced into the British market by Atlas Copco (Great Britain), Limited, Beresford Avenue, Wembley, Middlesex. This increase in power has been achieved by incorporating a new design of vane-type motor. Six-, seven- and eight-in. grinding wheels may be used with this tool and the rotor is fixed axially to prevent friction at the end-plates. The new grinder (Fig. 4) has a patented non-wearing type governor, and is equipped with an overspeed safety coupling, which automatically disconnects the arbor spindle from the motor if the governor should fail.

A double-action air-intake valve is incorporated, which momentarily retards the initial air input to give a smooth start, whilst at the same time eliminating sudden torque reaction. To eliminate maintenance all ball-bearings are completely sealed, and the housing is made of a heat-treated lightweight alloy, with replaceable steel inserts for all clamping screws. An oil chamber with adjusting screws ensures correct lubrication for the air motor. The net weight of the LSR 81 is 12 lb., the overall length is 24 in., and the spindle dia. is $\frac{5}{8}$ in. It is available in various designs capable of operating at 4,500, 5,100, and 6,000 r.p.m.

A NEW TYPE OF VAPOUR-BLASTING EQUIPMENT is now being marketed, under the trade name Hydrotron, by Metachemical Processes, Limited, of Crawley, Sussex. It is made from Vybak Industrial Rigid P.V.C. Sheet (from Bakelite, Limited) and comprises a Vybak blasting-cabinet and supporting structure, beneath which is located a large polyethylene container for holding the abrasive slurry. Compressed air is used to displace the slurry from the container to the blasting gun housed in the cabinet.

ALFRED BULLOWS & SONS, LIMITED, Long Street, Walsall, have recently introduced two new nozzles—A8P and A9P—for use with their L200 (model 2) spray gun. They are intended for low-pressure spraying, for instance, where exhaust facilities are inadequate and overspray must be reduced to a minimum.

FIG. 4.—*Portable grinder, introduced by Atlas Copco (Great Britain), Limited, of Wembley.*

Publications Received

Crane Safety in the Iron and Steel Industry. A special publication of the British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1. This well-produced brochure is a sub-committee report of the Federation's Accident Prevention Committee. It reveals that the occurrence of crane accidents is high in the iron and steel works, about 7 per cent. of the total reported; they are due mainly to the onerous duty imposed on cranes and their drivers. The book opens—not closes—with "Conclusions" and "Main Recommendations" and these equally concern those in charge of heavy foundries. There is one picture taken in a foundry which clearly shows a good design of a storage rack for chains. The six appendices are well worth studying, as they set out the minimum medical standards for crane drivers; "Permit to Work"—an extract from the Factories Act—section 27 (7)—which governs cases where men work on or near crane tracks; codes of practices for crane drivers and slingers and recommended hand signals. Taken altogether, this is an excellent publication.

Steel Castings. A very interesting publication has been received from Mason and Cox, Limited, of Holland Street, Southwark, South Australia. It opens by showing a number of cases where, by redesigning, steel castings became much cheaper than when the component was made by other means. Then, as a tear-off attachment, there is a form for obtaining the firm's advice for converting components into steel castings. On one side, this asks for the following information: description of component; present cost; unit weight; material; number required; delivery required; design faults. On the reverse side of the form information regarding improvements required; contact; address and telephone is requested. The reviewer congratulates this Australian foundry on its initiative in making it so easy for potential customers to make the first move towards real co-operation.

BCAC, Vol. 1, No. 1. Bulletin of the British Conference on Automation and Computation. Published from the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, London. S.W.1; price 2s.

The first issue of the *Bulletin* is mainly devoted to detailing the three groups comprising the "Conference," which are to represent this country internationally through the International Federation of Automatic Control. The Federation is built up around technical and scientific associations, and all the major industrial countries of the world are represented in this body. In group A—"Engineering Applications"—there are 20 technical institutions and societies listed, but as is unfortunately only too often the case, the foundry industry is without direct representation, yet automation is very highly developed in its major manufacturing plants.

Length of Working Life of Males in Great Britain. Published for the Ministry of Labour and National Service by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 3s. 6d. net.

For very large firms, this publication contains much useful information for use in connection with their pension and retirement schemes. For others it is of academic interest to learn that (1) On the average boys age 15 can expect to have 48.4 years in the working population. (2) Of the men aged 30, 62 per cent. can expect to be still in the working population at age 65, and (3) for those men aged 65 in the working population, 75 per cent. can expect to retire at some later age. A very large proportion (31 per cent.) can expect to retire before reaching their 66th birthday. A comparison between 1931 and 1955, shows that over this period the expectation of working life at birth rose from 40.6 years to 45.6 years—an increase of 12½ per cent. This was due entirely to the reduction in mortality rates.

New Catalogues

Technical Dictionaries. Often in short supply just when needed are technical dictionaries, especially those dealing with a specialized industry and particularly those embracing foreign languages. Thus the range of books for the foundry and related industries included in the catalogue of publications available from Bailey Bros. & Swinfen, Limited, Hyde House, West Central Street, London, W.C.1, has distinct interest. Included in the catalogue is a glossary of die-casting terms in five languages; an English/French Foundry Vocabulary (published in 1953); an "International Foundry Dictionary (nine languages, with reverse indices) volume I: Smelting and Metallurgy" (published 1955); an "English/German and German/English Dictionary for the Iron & Steel Industry" (published in 1955), and the AFS Glossary of Foundry Terms (Russian/Czech and English/Czech). In addition, subject headings under which other dictionaries are listed include: engineering (civil and mechanical); industrial heating; industry (industrial furnaces); mechanics and metallurgy. Apart from slight misgivings in the mind of the reviewer that the term "Foundry" in other countries is often a wide term embracing also steelworks, forges and rolling mills, the books would appear to be very useful to businesses doing export/import trade with continental countries.

Hot-brass and Light-alloy Pressings. A catalogue received from Brass & Alloy Pressings (Deritend), Limited, Liverpool Street, Birmingham, 9, enables one to see how the publicity from this branch of industry compares with that emanating from the foundry. The front cover of the publication is excellent; it is carried out in pillar-box red and carries a picture of a dome-shaped bell. At the side of this is stuck on in high relief a bronze-coloured picture of a crank, from one leg of which a rope, printed in black, is suspended. An obvious appropriate slogan, indicated by sound rays emanating from the bell, completes the picture. Inside the booklet there are illustrated groups of what from the foundry point of view would be simple shapes. Appropriate colour has been used for the brass pressings but not for those made in light alloys. The technical and commercial matter is well presented.

Investment Castings. An "out-of-the-ordinary" brochure on this subject has been received from Precision Products (Cumberland), Limited, High Mill, Alston, Cumberland. It is so described because each paragraph starts with an illuminated letter and is headed by an italicised caption printed in red. The format is 6¼ by 5½ in. and in a pocket on the inside of the front cover is carried a series of excellent photographs of precision castings made by the firm—each with an indication of the component's size. This use of loose photographs is quite a good system, as new pictures, perhaps of some component specially interesting to the recipient, can be added from time to time. After all, it is not necessary to vary the text very often.

American Letter

Sand Movement and Compaction*

A study of the principles controlling sand movement during squeezing, jolting and contour squeezing, and combinations of these, has been made. As compaction of the sand occurs, the mechanical properties of the sand change in the manner shown in Fig. 1. The moulding-sand movement caused by the moulding action was observed by making a black-and-white checkerboard grid of sand in the flask. Moulding effort was then applied in the form of squeezing, jolting, or jolting with a follow weight.

Squeezing: A mould-hardness survey from the top of a 6-in. deep pattern to the parting line revealed a maximum mould hardness of 93-98 above the pattern, diminishing to 25 adjacent to the parting.

Jolting: The gross movement of sand from 20 jolts of 3-in. length resulted in a maximum density at the parting, and just above the pattern. A mould hardness of 82-88 at the parting decreased to 45 away from the parting. Discontinuities in the sand at the corners developed because of this lack of fluid flow.

Contour Squeezing: Many different designs of contour squeezing frames were studied, leading to a set of design rules for contour squeezing. Other methods of using the contour frame to achieve moulds of high and uniform density and hardness are given. For example, after the flask has been loaded with the proper weight of sand, conventional jolting may be applied, followed by squeezing with the contour frame to complete moulding.

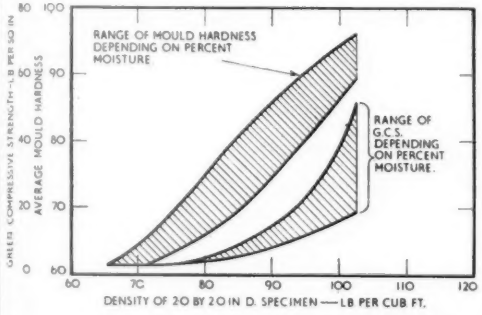

GREEN COMPRESSIVE STRENGTH—LB PER SQ IN
AVERAGE MOULD HARDNESS
RANGE OF MOULD HARDNESS DEPENDING ON PERCENT MOISTURE
RANGE OF G.C.S. DEPENDING ON PERCENT MOISTURE.
80 100
60 90
40 80
20 70
0 60
60 70 80 90 100 110 120
DENSITY OF 2·0 BY 2·0 IN D. SPECIMEN — LB PER CUB FT.

FIG. 1.—*Graph showing how mechanical properties change as compaction of sand occurs. The sand mixture used was:—six per cent. bentonite, two per cent. D-4 seacoal (coal-dust), and one per cent. carbonized cellulose; 85 per cent. of the mixture remained on the AFS/4-screen sieve. (GCS= Green compression strength.)*

Current Trends in Industry

The American Iron and Steel Institute has reported that steel shipments for 1958 were 25 per cent. lower than for 1957, 60,000,000 tons of finished products being delivered, compared with 80,000,000 tons in 1957. The record year to date is 1955, with deliveries totalling 85,000,000 tons.

Whilst steel production for January, 1959, is 10 per cent. ahead of January, 1958, the pace has been slowed by the risk of impending labour difficulties. The increase in unemployment from 3,500,000 in January a year ago to 4,700,000 in January, 1959, represents newcomers for the most part, and the active labour force is unchanged.

Copper: The price of copper has increased by 1 cent per lb. to 30.00 cent.

Cobalt: From February 1, cobalt has been 25 cents per lb. cheaper. The African Metals Corporation has reduced the price of cobalt granules in 500-lb. drums from two dollars per lb. to one dollar, seventy-five cents. Two years ago the prices were cut by 35 cents per pound. The present step is primarily intended to increase the consumption of this metal.

Vanadium: About 10 per cent. of the vanadium supply is used for cast iron, cast steel and non-ferrous alloying, and the balance mostly for wrought steel.

Growing British Trade with USSR

Rustyfa, Limited, the British consortium formed in 1957 for the purpose of supplying plant and equipment for a large tyre-factory now being built in the Ukraine, has received a further order valued at over £1,000,000.

This latest order, which is mainly for rubber processing machinery, brings the total of Rustyfa's contribution to British exports up to £14,000,000. Plant and equipment so far shipped for the tyre-factory project is valued at nearly £3,000,000.

British thermoplastics and rubber manufacturers, B.T.R. Industries, Limited, announces that nearly six miles of its rubber-covered conveyor belting—some of it the widest and thickest ever made—is now on its way to a large ore field in Russia. The contract was obtained against world competition and was completed on schedule within three months. It is believed to be the first application of 100 per cent. Terylene fabric in a major conveyor system.

Other Firms Benefiting

Other British firms benefiting from the growing trade with Russia and Iron Curtain countries are Massey-Ferguson, Limited, which has received orders worth £8,000,000 for tractors and combines for Yugoslavia; Lancashire Dynamo Holdings, Limited, which is providing through a subsidiary about £400,000 worth of electronic control gear and other products for the tyre factory; Thompson Bros. (Bilston), Limited, which is supplying stainless-steel vessels for the £5,000,000 cellulose acetate plant, which is being established near Moscow, the main contractor for which is Courtaulds, Limited, and British Thomson-Houston Company, Limited (electrical equipment), and Bulpitt & Sons, Limited (spinning bobbins), for the cellulose acetate plant.

Belliss & Morcom, Limited, has sent a 6,000 kw diesel generating plant worth about £100,000 to Russia, and Ruston & Hornsby, Limited, is sending next month the first British industrial gas-turbine to be installed in the USSR.

Mr. BASIL GRIFFITHS has been appointed director of manufacturing and group services by the Incandescent Heat Company, Limited, furnace manufacturers, etc., of Smethwick, Birmingham.

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* This article is a synopsis of paper to be presented at the forthcoming AFS Congress in Chicago (April 13-17). The authors are T. J. Bosworth, R. W. Heine, J. J. Parker, E. H. King and J. S. Schumacher. Of the authors, R. W. Heine is associated professor and T. J. Bosworth student assistant at the University of Wisconsin, Madison. J. J. Parker is secretary, SPO, Inc., Cleveland; E. H. King is president, and J. S. Schumacher chief engineer of Hill & Griffith Company, Cincinnati, Ohio.

Company News

Metal Industries Offer for Avo, Limited

Offer for the whole of the share capital of Avo, Limited, manufacturers of electric and electronic instruments and coil-winding machines, of London, S.W.1, has been made by Metal Industries, Limited. The offer, which has been accepted in principle by Avo directors, is 10s. in cash for each 2s. ordinary Avo share with the option of one new £1 ordinary share in Metal Industries for every four Avo shares. Substantial shareholders, holding not less than 60 per cent. of the issued share capital of Avo, have indicated that they will accept the offer for cash.

Avo was formed in 1923 and has issued capital of £250,000 in 2,500,000 ordinary shares of 2s. each. Taylor Electrical Instruments, Limited, Slough (Bucks), is a subsidiary. Metal Industries, which has an issued capital of £5,900,000 and assets exceeding £11,000,000, owns Brookhirst Switchgear, Limited, and the Igranic Electric Company, Limited, and, during the past year, acquired Farmer Bros. (Shifnal), Limited, and Towler Bros. (Patents), Limited.

A letter commending the offer and giving an assurance that no substantial changes will be made in the operations of Avo, has been sent by Mr. J. H. Rawlings, managing director of Avo, to the firm's 600 employees and to the 150 employees of the subsidiary, Taylor Electrical Instruments.

The link, if it comes about, will be of great benefit to Avo, Mr. Rawlings states, and he adds: "My fellow directors and I will continue to manage the day-to-day running of the factory. Your pension schemes and your welfare will be fully safeguarded. The chairman of Metal Industries, Sir Charles Westlake, has assured me that, although his group has 6,000 employees and factories in many parts of the country, it is not a soulless giant. It prides itself on 'putting people first'—as we do here in Avo."

Metal Industries forecasts a final dividend of 10 per cent., which again brings the total dividend up to 14 per cent. The new Metal Industries shares to be issued under the offer for Avo will rank for the final dividend.

British Oxygen Company, Limited

In addition to a 6 per cent. final dividend to make 10 per cent. for the year ended September 30, 1958, the British Oxygen Company, Limited, has declared a special 2 per cent. interim for the current financial year for profits tax reasons.

Group profits increased by more than £2,000,000—from £9,181,548 to £11,319,153, while group turnover rose by 15.7 per cent., this being spread over a wide range of products manufactured in the UK and overseas. Group net profit of £3,334,062 compares with £2,748,986, of which £2,876,208 (£2,440,245) is available to the parent company.

SUPERHEATER COMPANY, LIMITED—The company proposes to redeem its outstanding £195,000 5½ per cent. preference stock at 21s. 6d. per £1 unit on April 1. Separate class meetings will be held on March 12.

A.B.C. COUPLER & ENGINEERING COMPANY, LIMITED—A formal offer has been made for the £225,000 ordinary capital of General Stockholders Investment Trust, at 27s. 6d. per 5s. share. The offer will involve £1,237,500.

ALFRED HERBERT, LIMITED, machine-tool makers, etc., of Coventry—Trading profit contracted to £2,251,984 (£3,666,922) and the net profit for the year to October 31, 1958, is £1,417,975 (£1,821,311). The dividend is maintained at 6 per cent., tax free, on the £10,923,750 ordinary capital as doubled by a scrip issue, with a final of 4 per cent. net.

MATHER & PLATT, LIMITED, electrical, textile, and hydraulic engineers, etc., of Manchester—A final dividend of 8 per cent. on a capital increased by a one-for-two scrip issue makes the equivalent of 10½ per cent. for 1958, compared with a previous distribution equal to 10 per cent. Consolidated trading profits fell to £1,435,344 (£2,054,423) and the net profit from £1,063,959 to £712,022, after tax of £727,240 (£988,215).

F. PERKINS, LIMITED, diesel-engine manufacturers, of Peterborough—The offer of Massey-Ferguson Holdings, Limited, to acquire the company's 5,200,000 ordinary 10s. shares at 17s. 3d. a share in cash has been accepted by holders of 4,629,557 shares, equivalent to 89 per cent. of the total. The offer has therefore been declared unconditional. Announcing this on February 13, Philip Hill, Higginson & Company stated that it would continue to receive late acceptances.

STEETLEY COMPANY, LIMITED, manufacturers of heat-resistant furnace linings, of Worksop (Notts)—A final dividend of 8 per cent. is announced, making the equivalent of 11¼ per cent. for 1958 on an ordinary capital increased to £4,251,561 by a one-for-two scrip issue. The previous 16 per cent. dividend is equivalent to 10¾ per cent. on the present capital. Group profits expanded from £2,388,479 to a new record of £2,755,068, the net profit of £956,500 compares with £925,963.

COLTNESS IRON COMPANY, LIMITED—The company's main interests are now in brick and cement manufacturing and in general engineering. Group profits for the year to September 30, 1958, dropped to £134,519 (£179,109) and the balance, after lower tax, is £55,908 (£72,134). Following the reduced 5 (7½) per cent. interim, the final is held at 7½ per cent. giving a total dividend at 12½ (15) per cent. Amounts retained by subsidiaries are £16,858—a year ago a retention of £10,411 included £4,660 pre-acquisition profits.

GEORGE COHEN 600 GROUP, LIMITED—In an interim report, Mr. Cyril M. Cohen, the chairman, states that profits are running at a substantially lower level compared with last year. The fall in demand for capital plant of the type manufactured by the group and reduced requirements for steel have adversely affected the current year's trading. The interim dividend on account of the year ending March 31, 1959, is maintained at 4¼ per cent., but the directors are unable at this stage to forecast the final.

ASSOCIATED ENGINEERING HOLDINGS, LIMITED—Philip Hill, Higginson & Company, Limited, has arranged to place at 18s. 3d. per share 425,000 5½ per cent. redeemable cumulative preference shares of £1 each. The new shares form part of an authorized total of 3,000,000 of which 2,500,000 shares are already in issue. The remaining 75,000 are being offered on a one-for-one basis by the company in exchange for the 75,000 5½ per cent. £1 cumulative redeemable preference shares of the subsidiary, Aeroplane & Motor Aluminium Castings, Limited.

Recent Wills

MARTIN, PERCY, former managing director of the Birmingham Small Arms Company, Limited ... £63,054

HAIGH, DAVID, chairman of John Haigh & Sons, Limited, woollen and worsted machinery manufacturers and ironfounders, of Huddersfield ... £30,074

BROWN, W. T., retired representative of E. Green & Son, Limited, manufacturers of fuel economizers, air pre-heaters, etc., of Wakefield (Yorks) £1,977

LLOYD, RICHARD, a director of the Effingham Steel Works, Limited, Sheffield, and London area manager of the associated firm, Marsh Bros. & Company, Limited £11,705

Notes from the Branches

South Africa

The New Year started off for the South African branch of the Institute of British Foundrymen with a "full house," when Mr. E. Beaver, together with Mr. S. Chrobok, presented a paper entitled "Rapid Analytical Control in the Manufacture of Blackheart-malleable Iron." The authors introduced the lecture by discussing the importance of chemical analysis in the metal industry, with particular reference to rapid routine analysis as applicable in their own foundry, where the duplex process calls for rapid and accurate methods of chemical analysis which conventional chemical methods cannot achieve. It was stated that the elements requiring rapid determinations were silicon, manganese, carbon and sulphur. With carbon and sulphur, accurate determinations can be made by means of conventional combustion methods, but silicon and manganese present a problem as far as rapidity of measurement is concerned. A comparison between the conventional, and the absorptiometric methods is shown in Table I.

TABLE 1.—*Comparison Between Conventional and Absorptiometric Methods for Determination of Silicon and Manganese.*

Element.	Time taken by conventional chemical methods.	Remarks.	Time taken by absorptiometer method.	Remarks.
Silicon ..	1 hr. ..	Requiring mostly constant care by one operator for ½ hr.	Silicon and manganese combined in 20 min.	One operator can handle both determinations in 20 min.
Manganese by Bismuthate method	½-hr. ..	Requiring constant care by one operator for ½ hr.	—	—

On the subject of colorimetric chemistry the authors made the following statement: "The laws of colorimetric chemistry are mathematically perfect, but rapid methods were unreliable until comparatively recent times, chiefly due to limitations of accuracy and sensitivity of the measuring systems in use at that time. Roughly it can be stated that if there be a coloured chemical compound in solution, the greater the concentration of that compound the darker will be the solution. Early colorimeters relied to a great extent on the skill of colour comparison of the operator and such factors as colour-blindness, fatigue, influence of light source rendered colorimetric determinations somewhat unreliable. . . . In modern spectrophotometric equipment, light of a definite wave length is used and the measurements are made photoelectrically. This is obtained by a suitable filter which will absorb all colours of the spectrum except one colour on a restricted spectral wave band which will be transmitted freely to the photocell. This renders the photocell more sensitive to that specific colour. . . . Dependent on the colour of the solution, different colour filters are used to increase the sensitivity of the cell to the liquid under test." Details were then given of the design and operation of spectrophotometric equipment installed in the authors' foundry and used for determination of silicon and manganese. At the conclusion of the lecture, a 20-min. sound and colour firm was shown, which outlined the method already described. The film was produced by Mr. Beaver, and he was heartily congratulated on this in the subsequent discussion, which was concluded by a vote of thanks proposed by Mr. R. T. Rounce.

FTE & SA Contribution to IBF Conference Fund

Members of the Foundry Trades Equipment and Supplies Association have made group and individual contributions to the 1959 Conference of the Institute of British Foundrymen, to be held at Scarborough. A cheque for £260 4s. has been sent, this being the total amount subscribed to the conference fund by the following members of the Association:—

Wm. Aske & Company, Limited.
August's, Limited
F. J. Ballard & Company, Limited.
Bradley & Foster, Limited.
British Moulding Machine Company, Limited.
Fordath Engineering Company, Limited.
Foundry Plant & Machinery, Limited.
Foundry Services, Limited.
Foundry Suppliers, Limited.
FOUNDRY TRADE JOURNAL.
General Refractories, Limited
Harborough Construction Company, Limited.
W. C. Holmes & Company, Limited.
Incandescent Heat Company, Limited.
J. W. Jackman & Company, Limited.
Marco Conveyor & Engineering Company, Limited.
Monometer Manufacturing Company, Limited.
Paterson Hughes Engineering Company, Limited.
Pneulec, Limited.
Prat-Daniels (Stroud), Limited.
Rapid Magnetic Machines, Limited.
Ridsdale & Company, Limited
Rubery, Owen & Company, Limited.
Spencer & Halstead, Limited.
Sterling Foundry Specialties, Limited.
Sternol, Limited.
Colin Stewart, Limited.
Isaac & Israel Walker, Limited.

First Molybdenum Casting ?

Metallurgists at a United States Bureau of Mines laboratory at Albany, New York, claim to have produced the world's first casting of molybdenum. Because of this metal's capacity to withstand intense heat—which makes it ideal for use in advanced types of reactors and in space rockets—this feat is regarded as a major step in furthering America's rocket and earth-satellite programme. The casting was made under remote control conditions in an inert atmosphere by means of a high-density electric arc. A 30-lb. charge of molybdenum was melted in a water-cooled, copper-lined crucible. The molten metal was poured through a series of troughs into a rapidly rotating graphite cylinder. Here, the metal was forced to the walls of the rotating mould where it consolidated to produce a hollow molybdenum cylinder 8-in. long and 4½-in. dia. Experiments are being pressed forward on improved techniques to develop the moulding of the various shapes required for rocket-propulsion and earth-satellite uses.

New Factory for Scotland

A Swedish firm has signed a contract with Irvine (Ayrshire) Town Council to open a factory on the town's new industrial estate. It was signed by Mr. Leonard Maxe, chairman of the firm, and Provost Donaldson. The factory, which will give employment to 40 or 50 skilled workers, will produce machine-tools mainly for export to Commonwealth countries. The firm, which is likely to be named the Scottish Scandinavian Machine Tool Company, will take over 9,000 sq. ft. in the estate. The project will cost the Swedish firm £20,000; work on the plant is expected to commence in a few months time, when key personnel from Sweden will go to Irvine to train local labour.

News in Brief

FORTY WORKERS at the Ruabon works (Denbighshire) of Monsanto Chemicals, Limited, received a month's notice of dismissal on February 13. About 2,000 men are employed there.

SIMMONDS AEROCESSORIES, LIMITED, a member of the Firth Cleveland group, announce the formation in Belgium of a subsidiary company, Simmonds Aerocessories (Belgium) S.A. at 25 rue Faider, Brussels.

A MEETING of the iron and steel engineers' group of the Iron and Steel Institute is to be held in Amsterdam, from April 14 to 17. Details are available from the secretary at 4, Grosvenor Gardens, London, S.W.1.

ONE OF THE LARGEST ORDERS yet placed by South African Railways for locally-manufactured goods, has resulted in a £5,000,000 contract for the Union Carriage & Wagon Company (Pty.), Limited, a recently-established associate company of Leyland Motors, Limited.

ARTHUR TIPPER, LIMITED, makers of builders iron equipment, Victoria Foundry, Willenhall, Staffordshire, have purchased the business of Walter P. Edmunds, Limited, with similar products, of Darlaston Road, King's Hill, Wednesbury, whose foundry is to be closed.

TRADE RECESSION has affected two engineering firms in Arbroath (Angus). The Coventry Gauge & Tool Company, Limited, announced on February 12 its decision to close. Douglas Fraser & Sons, Limited, ironfounders, textile engineers, etc., has given notice to 25 employees.

ANALYSIS of a West German railway line made from Bessemer steel in 1856 and recently examined showed not only traces of carbon, silicon, and manganese, but the presence of 0.5 per cent. phosphorus and 0.2 per cent. sulphur. The Vickers index was 175. The steel broke after being heated.

BY COMBINING manufacturing capacity, Herbert Morris, Limited, Loughborough (Leics), and Steels Engineering Products, Limited, Sunderland, will produce cranes bearing the other's trade mark. Both companies will continue to market and service its own products separately as before.

A TABLE OF RETURNS from 46 Scottish branches of the Amalgamated Union of Foundry Workers shows that in only one district—Dunfermline—the state of trade is considered to be good. Sixteen other branches reported the state of trade as fair, and a further 22 branches considered it to be poor.

ON MARCH 12 Sir Leonard Owen, managing director of the UK Atomic Energy Authority is to deliver the second annual lecture of the Institute of Welding on the subject of "Welding and the Nuclear Power Programme." The lecture will be given at the Institute and admission is by ticket, obtainable from the secretary at 54 Princes Gate, London, S.W.7.

SEVENTY-YEAR-OLD IRON BOLLARDS from an old recreation ground in Leadmill Road, Sheffield, are being erected as barriers in the new frontage to Sheffield Cathedral. Each bears a coronet and the cypher, "HN"—the ducal coronet and monogram of the late Henry, 15th Duke of Norfolk, father of the present Duke and Sheffield's first Lord Mayor.

THE KODAK "DATA BOOK OF APPLIED PHOTOGRAPHY," which embraces photography in industry, medicine, research, education, etc., and is usually published in four volumes, is to be expanded to five volumes to keep pace with the growing number of new photographic applications in these and other fields. The extra volume will allow for quick reference and the easy insertion of new sheets.

A ONE-DAY CONFERENCE on "Noise in Industry," to be held at Earls Court, London, on April 10, commencing at 10.15 a.m., is scheduled to be opened by the Rt. Hon. Hilary A. Marquand, M.A., D.SC., M.P. The Conference is being held in conjunction with the heat and sound insulation exhibition and the Factory Equipment Exhibition. Details are available from the Conference secretary, 4, Snow Hill, London, E.C.1.

TECALEMIT, LIMITED, have recently purchased half of the ordinary shares in British Filters, Limited, of Maidenhead. Mr. S. G. Gates, C.B.E., chairman, and Mr. P. R. Scutt, managing director of Tecalemit, Limited, will join the board of British Filters; Mr. T. E. Worth, B.A., M.I.MECH.E., present chairman and technical director, will continue in that capacity, together with Mr. Nigel J. Bennett, who will continue as managing director.

STOKE CASTINGS, LIMITED, Union Foundry, Mansfield, last week held their sixth annual dinner of the firm's Sports and Social Club. Among those present were the Mayor and Mayoress of Mansfield (Councillor W. H. Simpson, and Mrs. Simpson), Mr. H. S. Jeffrey, senior vice-chairman of the firm, and other officials. In a speech, Mr. H. S. Jeffrey, referred to the recent modernization of plant, and the welfare equipment at the works including new shower baths.

AN AGREEMENT for the construction of a £4,500,000 dam and hydro-electric project on the Blue Nile has been signed by the English Electric Company, Limited, and the West German Siemens Company, with the Sudanese Government. The scheme, which provides for two power stations, one at the dam and one at Khartoum, will be executed in two stages, the first to be started immediately and finished by January, 1961, and the second to be completed by April, 1962.

INCREASING TRADE WITH CANADA and the prospect of further orders for aero- and diesel-engines has led to the formation by D. Napier & Son, Limited (a member of the English Electric group), of a Canadian subsidiary, D. Napier & Son (Canada), Limited. Head office of the new company is in Montreal. Mr. H. Sammons, managing director of D. Napier & Son, is the president and Mr. L. A. Sanson, formerly Napier's senior representative in Canada, executive vice-president.

BROOMWADE-KNOX PTY. has been formed in Melbourne with a nominal capital of £100,000 and paid capital of £30,000 to manufacture air compressors and pneumatic equipment. Broom & Wade, Limited, High Wycombe (Bucks), holds 60 per cent. of the capital and the remainder is owned by Knox Schlapp Pty., a subsidiary of N.K.S. Holdings. Knox Schlapp has sole distribution rights of Broom & Wade products and has been engaged in local assembly of a limited range for the past two years.

"MANAGEMENT FOR SALES" has been chosen as the general theme of the northern conference of the British Institute of Management being held at the Prince of Wales Hotel, Southport, on April 2 and 3. One of the papers to be presented is "Organizing for Distribution" by Mr. J. L. Hepworth (joint managing director, Hepworth & Grandage, Limited). At the closing dinner, the Rt. Hon. the Earl of Verulam, J.P., chairman of the Institute, will speak on "Sales in the National Economy" with Mr. L. T. Dawes (commercial director, Beyer, Peacock & Company, Limited), in the chair.

THE DIAMOND MANUFACTURING INTERESTS of Impreg-

nated Diamond Products, Limited, of Gloucester, and of Universal Grinding Wheel Company, Limited, of Stafford, are being concentrated at Gloucester as a result of the purchase by the latter company from the Bath & Portland Stone Firms, Limited, of a 50 per cent. shareholding in Impregnated Diamond Products, Limited. The product will in future be sold in the United Kingdom under the trade name "Uni-Neven" by Universal Grinding Wheel Company Limited in addition to the fields already covered by Wickman, Limited, of Coventry, whose limited sales agency is unaffected by the merger. A specialist engineering sales force will be provided by Impregnated Diamond Products, Limited.

STAR ALUMINIUM COMPANY, LIMITED Wolverhampton has completed a new four-storey laboratory block on its Penn Road frontage, the first stage of a development planned for that site and for the company's works at Bridgnorth. The new laboratory, which has just been brought into use is equipped for the constant surveillance of metallurgical processes associated with the rolling of aluminium from billet to foil. Considerable use has been made of aluminium in the construction of the laboratory. It will be recalled that the company has, in co-operation with the Building Research Station of the Department of Scientific and Industrial Research, done much to develop the use of aluminium for building purposes. Recently the company pioneered the use of aluminium as a roofing material at its new Bridgnorth plant. The Star Aluminium Company was founded in Wolverhampton 25 years ago.

A MILLION DOLLAR CONTRACT (approximately £350,000), involving the supply of two acres of aluminium and glass wall to encase a seven-storey office block which is being built for the Philippine American Life Insurance Company in Manila, has been secured by the Smethwick firm of Henry Hope, Sons, Limited. Some 240 tons of aluminium and 150 tons of hot-dip galvanized steel will be used in the walling, which has been designed to withstand wind forces up to 150 m.p.h. The contract, one of the largest won by a UK firm in the Philippines, was secured against strong international competition. Negotiations were commenced eight years ago by Mr. Michael Hope, chairman and managing director of Henry Hope, when on a business visit to the United States in 1951. The contract was confirmed on February 17, with the return to the UK of Mr. B. Bishop, manager of the pressed-steel department, from a trip to the USA and the Philippines.

TO ENSURE THAT CONTRACT DATES are met, Davy and United Engineering Company, Limited (Sheffield), have adopted a new method of erection for their part of the Durgapur steel project contract, entailing erection of buildings before installing plant foundations. Erection of the rolling-mill buildings began according to programme at the end of December, 1958, and the complete building for the whole of the mills area is scheduled for completion by the end of May, 1960, by which time the 42-in. blooming mill, the 32-in. intermediate mill and the Morgan billet mill should be in operation. The foundation work for the iron and steel foundry, is still in progress; the foundry being scheduled for completion ready for the production of ingot moulds, etc., by the end of October this year. The central engineering maintenance department building is well advanced, the sheeting having been completed on three bays and two cranes erected. Plant shipments are almost complete and are expected to be finished by March this year.

THE CORPS OF THE ROYAL ENGINEERS will be prominent at the 323rd Cutlers' Feast on March 17. The Master Cutler, Mr. J. Hugh Neill, is a former lieutenant-colonel of the corps, and his father, Colonel Sir Frederick Neill, a former Master Cutler, is honorary colonel of the 106 Field Regt. R.E. (T.A.) of Somme Barracks, Sheffield. Present at the Feast will be the Chief Royal Engineer, General Sir Kenneth Crawford, the Engineer-in-Chief, War Office, Major-General Sugden, and the Chief Engineers of the Northern, Western, Eastern, Southern and Scottish Commands. The corps band from Chatham will provide music and fanfares at the Feast, and the guard of honour will be provided by the 106 Field Regt. R.E. (T.A.) Among those representing the Forces will be the Chief of the Imperial General Staff, General Sir Francis Festing, the Chief of Air Staff, Air-Vice-Marshal of the Royal Air Force, Sir Dermot A. Boyle, and the G.O.C.-in-Chief, Northern Command, Lieutenant-General R. W. Goodbody.

Worshipful Company of Founders

The Worshipful Company of Founders' annual spring visit to foundries will this year be based on Sheffield from April 29 to May 1; accommodation is being reserved at the Royal Victoria Hotel. The first function is a visit in the afternoon of April 29 to the offices and showrooms of Thos. W. Ward, Limited, followed by cocktails as the guests of the Master of the Company of Cutlers of Hallamshire, and dinner in the Cutlers' Hall, by invitation of Thos. Ward, Limited. On April 30, the works of English Steel Corporation, Limited, will be visited, followed by luncheon provided by the courtesy of the directors of the Corporation. After luncheon, the party will visit Chatsworth House, under the guidance of the librarian, Mr. Wragg. Dinner in the evening will probably be at the Royal Victoria Hotel, where the hosts of the tour will then be the guests. On May 1, there will be a visit to the British Steel Castings Research Association, followed by a visit to the works of Hadfields, Limited, whose directors will provide luncheon at the Royal Victoria Hotel. At 3.20 p.m. the party will entrain for the return to London.

Board Changes

DELTA METAL COMPANY, LIMITED—Mr. Maurice Overton has resigned as a director for health reasons, but will act as technical consultant to the Delta group.

GUEST KEEN & NETTLEFOLDS IN PAKISTAN, LIMITED—Mr. Masud Karim, a director, has been appointed managing director. Mr. Karim came to this country last summer for a short tour of production centres in the Guest Keen group and other works.

TELEGRAPH CONSTRUCTION & MAINTENANCE COMPANY, LIMITED—Mr. D. W. Aldridge and Mr. W. C. Handley have been appointed to the board. Both are directors of British Insulated Callender's Cables, Limited. Mr. W. F. Randall, managing director of the Telcon Metals group, has been elected deputy chairman. Major H. Denison-Pender, Mr. J. Innes, and Dr. E. W Smith have retired from the board of the Telegraph Construction & Maintenance Company.

Latest Foundry Statistics

Copper-base Castings. The output of copper-base castings in 1958 was 73,926 tons or 3,222 tons less than 1957. These figures are given in the monthly *Bulletin* of the British Bureau of Non-ferrous metal Statistics. December's production was 6,608 tons—a figure rather higher than the monthly average.

Personal

Mr. S. E. GRAEFF has not sought re-election as a director of the Steel Company of Wales, Limited, and now resides in the US.

Mr. JOHN L. TOOLE has been appointed vice-president, accounting and finance, of Canadian National Railways, from March 1.

Mrs. BRENDA JAMES has become the first woman to gain a higher national certificate in metallurgy at the Chance Technical College, Smethwick.

Mr. CLIFFORD HODGKINSON has been appointed foundry technical manager of John Fowler & Company (Leeds) Limited, Sprotborough Works, as from February 1.

Mr. J. H. PLANT, who has been sworn in as a Justice of the Peace for Wolverhampton, is managing director of W. G. Allen & Sons (Tipton), Limited, colliery, railway, and mechanical engineers, etc.

Mr. R. BALDWIN HOVEY, a director of Zan, Limited, aluminium founders and sheet-metal makers, Wheelock, Sandbach, Cheshire, has been elected president of Sandbach Chamber of Commerce for the tenth consecutive occasion.

Mr. R. C. CHIRNSIDE, chief chemist of the research laboratories of the General Electric Company, Limited, Wembley, has been nominated by the Council of the Society for Analytical Chemistry as president-designate to take office at the annual meeting in March.

Mr. ERIC MENSFORTH, chairman of Firth Brown Tools, Limited, Sheffield, and a director of John Brown & Company, Limited, left by sea on February 19 for Cape Town for an overseas tour of business and holiday. He will visit both South Africa and Rhodesia.

Mr. GEOFFREY M. BUTLER, joint managing director of the Butler Machine Tool Company, Limited, Mile Thorn, Halifax, Yorkshire, has been elected president of the Halifax and District Engineering Employers' Association, and is the fifth member of the Butler family to hold that office.

Mr. STAFFORD BEER, head of the department of operational research and cybernetics of the United Steel Companies, Limited, Sheffield, has been awarded the silver medal of the Royal Swedish Academy of Engineering Sciences. The award has been made in appreciation of lectures given in Stockholm last April.

Mr. D. P. CARR, manager of the trackwork department of Edgar Allen & Company, Limited, steelmakers, etc., of Sheffield, is this year's chairman of the Sheffield branch of the Permanent Way Institution. He has been connected with the Institution since 1925 and was previously chairman in 1950, the last occasion of the Institution's convention in Sheffield.

Col. T. EUSTACE SMITH, chairman and managing director of Smith's Dock Company, Limited, ship builders and repairers, of Middlesbrough, is visiting the United States. Col. Smith, who is vice-chairman of the Shipbuilding Conference, will have talks with American shipping representatives. Before returning to Britain in mid-March, Col. and Mrs. Smith will also visit Jamaica.

Mr. H. M. WOODHAMS, managing director of Sir W. G. Armstrong Whitworth (Aircraft), Limited, has been elected chairman but remains managing director. Mr. F. MARTIN, Mr. J. T. LIDBURY, Mr. J. A. R. KAY and Mr. S. D. DAVIES have been elected to the board. Mr. E. D. KEEN and Mr. C. BAYLY have been appointed executive directors. Sir W. G. Armstrong Whitworth Aircraft is a member of the Hawker Siddeley Group.

From March 1, Mr. ALBERT WHITFIELD will take over as general manager of Widnes Foundry & Engineering Company, Limited, Lugsdale Road, Widnes. Mr. Whitfield joined the company in 1938, becoming works manager in 1949, and appointed a director in 1955. The retirement from active duties of the joint managing director, Mr. RALPH CREDLAND, is also announced. Mr. Credland will remain on the board of directors in a consultative capacity.

Mr. JOHN L. DEFFENBAUGH has been appointed manager of the new tractor factory of the Caterpillar Tractor Company, Limited, in Glasgow. Mr. Deffenbaugh, a Virginian and B.SC., graduate of Kansas State College, USA, who is 42 years of age, completed 20 years' service with Caterpillar last year. He joined British Caterpillar in 1951, at Leicester, as technical adviser, and in late 1956 moved to the Glasgow headquarters as chief engineer. He was appointed in September, 1958, assistant manager to Mr. J. R. Munro, director of manufacturing and acting manager, whom he now succeeds. Mr. Munro was elected a vice-president of Caterpillar's parent company in Peoria, Illinois, on May 19, 1958, and will shortly be returning to the United States.

Obituary

Mr. HUBERT HARPER, founder of the Severn Engineering Company, Stourport (Worcs), died recently at the age of 60.

Mr. JACK RANBY, works manager of British Acheson Electrodes, Blackburn, near Rotherham, died on February 10 at the age of 49.

The death has occurred of Mr. G. B. PARKES, chairman of G. B. Parkes, Limited, Crown Works, Halesowen, and Moore & Cattell Limited, Lapal Works, Halesowen, at the age of 78.

The death has occurred at the age of 82, of Mr. WILLIAM BOW, who was for 21 years foundry manager at Tees Side Bridge & Engineering Works, Limited, Middlesbrough. He retired in 1941.

The death has occurred of Mr. ELLIS SHACKLETON, who for the past nine years had been sales manager of Dean, Smith & Grace, Limited, lathe and tool manufacturers, Keighley. He was 58 years of age.

Mr. JOHN OLIVER LUCAS, who has died at the age of 36, was a director of Joseph Lucas (Sales & Service), Limited, and Joseph Lucas (Export), Limited. He was a great-grandson of Mr. Joseph Lucas, who founded the organization.

The death has occurred at the age of 75 of Mr. W. BAMFORTH, founder and former principal of Bamforth, Garside & Company, Limited, ironfounders and engineers, Huddersfield. He founded the firm about 40 years ago with Mr. Tom Garside. Four years ago, it was taken over by Albert Taylor & Sons (Valves), Limited, Milnsbridge.

Mr. CHRISTOPHER S. OLIVER, until recently chairman and managing director of Rotherham & Sons, Limited, makers of non-ferrous parts, precision instruments, etc., of Coventry, died on February 14. He was 67 and was widely known for his work on behalf of the Engineering and Allied Employers' Federation. A former president of Coventry Engineering Employers' Association, he was a member of the national federation's management board and chairman of the central conference committee at York.

AFS Castings Congress and Show

Simplified production of castings of unusual design for modern engineering application will be emphasized at the 63rd AFS Castings Congress and the Engineered Castings Show, to be held concurrently in Chicago, April 13-17. Sponsored by the American Foundrymen's Society, the dual programme is being staged for product-design engineers from metal-using industries and foundrymen. The five-day meeting is intended to demonstrate that the problems associated with new design concepts can best be solved by castings . . . "which represent the shortest distance between raw material and finished products."

All types of cast metals and patterns for castings will be exhibited and discussed, both at the Show and in the more than 60 separate sessions of the Congress. Papers dealing with the design problems to be explored at the technical meetings include: "X364 Aluminium Die-casting Alloy," by Mr. E. V. Blackmum and Mr. J. H. Moorman, Alcoa, Pittsburgh; "Appraisal of Bending Techniques for Evaluation of Cast Materials and Structure," by Mr. J. C. Graddy, Douglas Aircraft Company, Santa Monica, California; "Stress Concentration and Castability," by Mr. J. B. Caine, consultant, Cincinnati; "Evaluation of Cast Surfaces for Roughness Standards," by Mr. Eldon Swing, Boeing Airplane Company, Wichita, Kansas, "How Aircraft Designers Look at Light-metal Castings," by Mr. A. R. Mead, Grumann Aircraft and Engineering Company, Bathpage, L.I., N.Y.; "Practical Planning for Non-destructive Testing by Use of Radiation,"* by Mr. Floyd Sutherland, Blaw-Knox Company, East Chicago, Indiana; "Designing for Press-forge Castings," by Mr. Paul Gouwens, Armour Research Foundation, Chicago; "Help for the Design Engineer or Foundryman," by Mr. J. J. Henry, Missouri Steel Casting Company, Joplin, Mo.; "Foundry Designing for Steel Castings," by Mr. A. B. Steck, Metallurgical Associates, Inc., Melrose, Mass.; "Requirements for Quality Castings in the Aircraft Industry," by Mr. Y. J. Elizondo, Chance-Vought Aircraft Company, California; "Design Engineering as Related to Magnesium Castings," by Mr. G. H. Found, Arthur D. Little, Inc., Cambridge, Mass.; "Electrical Conductivity of Sand-cast Copper-base Alloys," by Mr. D. C. Schmidt and Mr. F. L. Riddell, H. Kramer & Company, Chicago; and "Design and Welding of Castings for Steam Turbines," by Mr. L. W. Songer, General Electric Company, Schenectady, N.Y.

Both the Congress sessions and the Show will be staged in the Sherman Hotel, with divisional luncheon and dinner functions scheduled for both the Sherman and Morrison Hotels.

* Synopsis printed in the JOURNAL, February 19, p. 214.

Output Record for Steel, Peech & Tozer

Although the Steel, Peech & Tozer branch of the United Steel Companies, Limited, Rotherham, has been hard hit by part-time working for several months, its cold-rolling department recorded a production record in January. The weekly output of 711 tons achieved in that month was 8 tons more than the previous best.

The company also reports the booking of its first contract in the Mexican market—an order for railway axles and wheels.

YALE AND TOWNE MANUFACTURING COMPANY has recently opened a new service depot in Scotland at Wilson Place, Nerston Industrial Estate, East Kilbride, Lanarkshire.

Pressure Die-casters never say die!

Never say die when it comes to casting,
DIE SLICK'S a trick that's everlasting,
Here's a slick will make you master,
Casting cleaner, slicker, faster.

When you're in deep water friend,
And you feel this is the end.
When your cherished castings fail,
Holler for the DIE SLICK pail.

Foremen know its famous touch,
Just a dab or two, not much
Will transform a scene so tragic,
Successfully, as though by magic.

For aluminium, brass or zinc,
DIE SLICK is the missing link.
A choice of grades all made to measure,
Casting then becomes a pleasure.

Never say die when it comes to casting,
DIE SLICK'S a trick that's everlasting.

W. J. HOOKER LTD

239a FINCHLEY ROAD, LONDON NW3
Telephone: Swiss Cottage 3281-2-3.

Pig-iron and Steel Production

Statistical Summary of December Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in December. Table 3, weekly average production of finished steel in November. Table 4 gives the production of pig-iron and ferro-alloys in December, and furnaces in blast. (All figures are weekly averages in thousands of tons.)

TABLE 1.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials excl. fuel[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks[3]
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958—July ..	341	498	474	256	235	209	227	165	9	316	236	1,622
August	341	497	475	233	233	203	221	147	9	299	227	1,637
Sept. ..	341	496	470	271	241	211	231	198	6	369	279	1,621
Oct. ..	341	509	473	294	237	215	242	195	4	364	269	1,610
Nov. ..	341	509	476	289	237	210	234	187	5	352	281	1,563
Dec[4]	341	509	471	269	230	206	223	166	4	314	—	1,550

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings during December*, 1958. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys., Leics, Notts, Northants, and Essex ..	—	2.1	11.4 (basic)	1.6	0.1	14.1	1.1	15.2
Lancs. (excl. N.W. Coast), Denbighs, Flints, and Ches	1.1	30.3	—	2.1	0.2	32.6	1.1	33.7
Yorks. (excl. N.E. Coast and Sheffield)								
Lincs.	—	39.2	—	—	0.1	39.2	0.1	39.2
North-East Coast	0.4	59.1	—	0.9	0.2	59.4	1.2	60.6
Scotland	1.2	26.7	—	2.0	0.1	28.4	1.6	30.0
Staffs, Salop, Worcs, and Warwicks. ..	—	12.0	—	2.4	0.6	13.6	1.4	15.0
S. Wales and Mon.	1.6	65.5	5.2 (basic)	0.8	0.1	72.8	0.4	73.2
Sheffield (incl. small tonnage in Manchester) ..	5.4	27.3	—	8.7	0.3	40.1	1.6	41.7
North-West Coast	—	1.5	3.5 (acid)	0.3	—	5.2	0.1	5.3
Total	9.7	263.7	20.1	18.8	1.7	305.4	8.6	314.9[4]
November, 1958	12.2	293.4	23.4	20.9	2.0	342.1	9.8	351.9
December, 1957[4]	16.7	335.8	20.7	22.0	2.7	386.5	11.4	397.9

TABLE 3.—*Average Weekly Deliveries of New Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1956.	1957.	1957.	1958.	
			Nov.	Oct.[4]	Nov.
Non-alloy steel:					
Ingots, blooms, billets and slabs[5]	4.7	5.0	6.2	3.2	5.7
Heavy rails ..	9.7	11.2	11.8	10.5	11.2
Sleepers	1.1	1.3	1.1	1.0	2.7
Fish and soleplates	0.7	0.8	0.9	0.7	0.3
Plates:					
(i) ⅜ in. and over	30.3	34.0	37.4	26.7	25.8
(ii) Under ⅜ in. ..	19.9	20.3	22.1	16.8	18.2
Other heavy prod.	50.3	53.0	57.5	34.8	31.7
Ferro - - concrete bars	7.8	8.8	10.8	6.9	7.5
Wire rods	22.9	23.3	27.4	24.3	24.4
Arches, etc. ..	10.1	11.0	12.2	7.9	7.9
Other light sections	41.4	38.8	41.2	29.1	29.4
Bright steel bars ..	8.0	7.0	7.7	6.2	6.5
Hot-rolled strip ..	24.5	23.1	26.7	23.6	24.5
Cold-rolled strip ..	7.5	7.1	8.8	7.1	7.3
Sheets incl. coated:					
(i) Hot-rolled ..	15.0	13.0	14.7	10.5	9.9
(ii) Cold-reduced	24.8	29.1	32.5	32.3	35.2
Tinplate	15.9	18.8	17.6	21.6	22.1
Blackplate ..	1.3	1.0	1.2	0.8	0.8
Tubes up to 16-in.	26.20	22.1	22.8	18.4	20.9
Tube, pipe fittings	0.5	0.5	0.5	0.4	0.4
Tyres, wheels, axles, etc. ..	4.6	5.1	5.7	4.2	3.8
Forgings (excl. drop	3.0	3.1	3.5	2.3	2.4
Steel castings ..	4.5	4.6	5.2	3.8	3.9
Tool and magnet ..	0.3	0.3	0.3	0.2	0.2
Total	335.0	342.3	375.8	293.3	302.7
Alloy steel	17.3	17.8	20.7	13.6	15.0
Total deliveries from U.K. production[6]	352.3	360.1	396.5	306.9	317.7
Add: Imported finished steel ..	19.5	9.6	15.0	3.5	5.5
Deduct: Intra-industry conversion[7] ..	55.2	48.1	52.7	42.3	42.9
Total deliveries new material	316.6	321.6	358.9	268.1	280.3

TABLE 4.—*Production of Pig-iron and Ferro-alloys during December*, 1958.

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys., Leics., Notts., Northants, and Essex	20	—	15.5	20.1	0.1	—	35.7
Lancs. (excl. N.W. Coast), Denbighs., Flints., and Ches. ..	7	—	17.6	—	—	1.6	19.2
Yorks. (excl. N.E. Coast and Sheffield)							
Lincs	9	—	38.5	—	—	—	38.5
North-East Coast	18	3.0	42.1	—	—	0.8	45.9
Scotland	6	0.6	12.9	1.3	—	—	14.8
Staffs, Salop, Worcs, and Warwicks.	5	—	4.9	1.4	—	—	6.3
S. Wales and Mon.	11	3.4	42.8	0.1	—	—	46.3
Sheffield ..	2	—	3.0	—	—	—	3.0
North-West Coast	6	13.4	—	—	—	—	13.4
Total ..	84	20.4	177.3	22.9	0.1	2.4	223.1[4]
November, 1958..	85	23.7	190.0	17.6	0.2	2.2	233.7
December, 1957[4]	96	28.0	218.5	23.6	1.1	4.3	275.5

[1] Used in non-food manufacturing industries.

[2] Weekly average of calendar month.

[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.

[4] Five weeks, all tables.

[5] Other than for conversion into any other form of finished steel listed.

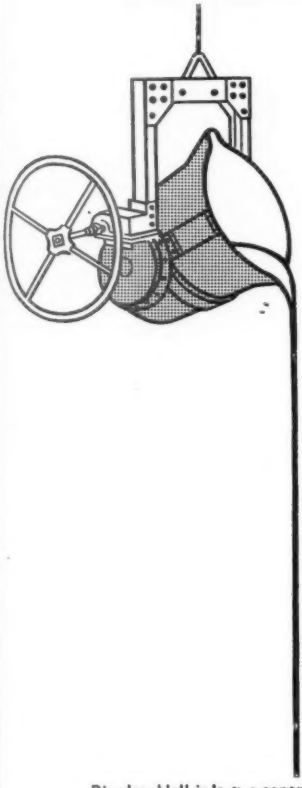
[6] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[7] Material for conversion into other products also listed in this table.

FOUNDRY EXHIBITION

BINGLEY HALL, BIRMINGHAM,
ENGLAND

MAY 21-30, 1959



British foundry machinery and supplies are in service in every country in the world where metals are cast. They exemplify in fullest measure the advanced design, technical achievement and unfailing reliability of British engineering and allied products.

In May next, foundrymen from all parts of the world will have the opportunity of studying all the most modern developments in foundry equipment and practice *at one time and in one place.* Nearly one hundred of the leading firms specialising in this field will occupy some 80,000 square feet at the first Exhibition for many years to be exclusively devoted to the British foundry industry. It will be held at the Bingley Hall in Birmingham, from May 21st to 30th, 1959.

New designs, new processes, and new materials will be on display; experts in every branch of foundry practice will be in attendance on the stands to welcome visitors and give them all possible information and assistance. No foundryman who is seeking ways and means of increasing productivity, improving quality and eliminating waste—and who is not?—can afford to miss this unique opportunity of seeing all that is best in foundry engineering achievement.

Bingley Hall is in the centre of Birmingham, close to the main railway stations from which fast trains run to all parts of the United Kingdom, and with easy access to the airport. Admission to the Exhibition will be by ticket or by trade card presented at the Hall. The Exhibition will be open from 10 a.m. to 6 p.m. (except Sunday). All enquiries regarding admission, accommodation, travel, etc., should be addressed to the Organisers who will give all possible assistance.

Address your enquiries to the Organisers :

HERBERT DANIEL EXHIBITIONS LIMITED,
3 Clifford Street, London W.1, England
Telephone : Regent 8611

Raw Material Markets

Iron and Steel

Although there is little change in the overall pattern of business at the ironfoundries, one bright feature is the improved demand for castings following the relaxation of credit restrictions. The motor-car industry has benefited, as have the light foundries which supply castings for the domestic utensil trade. The light foundries have been in the doldrums for a long period and the present signs of increased business are welcomed. Most of these foundries are mechanized and require a large volume of orders to keep them in full and regular production. Other light foundries catering for the building trade are in need of more work, while most of the jobbing and textile foundries are also short of orders.

The consumption of high-duty castings is at a reasonably good level, with the motor-car industry continuing well to the fore. These foundries are able to obtain reasonably good outputs, with prospects of a continuance of business at least at present levels for some time ahead. Demands for castings from the machine-tool industry tend to fluctuate; generally, they show an appreciable reduction on previous levels.

Producers of pig-iron are able to satisfy easily present requirements in all grades and analyses to meet the needs of individual consumers. Outputs generally are ahead of demands, which means an increase in the heavy stocks which are already being carried at the furnaces. Outputs of most grades of pig-iron could be stepped up appreciably; meanwhile, however, producers aim to dispose fully of their current outputs and also to reduce the stocks on hand. All grades are available for export, and much larger quantities could be supplied if orders could be secured against the keen competition and low prices offered by foreign makers.

There is a strong demand for heavy cast-iron and machinery scrap, and parcels arising are less frequent, while prices tend to increase. Foundry coke deliveries are satisfactory, and ganister, limestone, and firebricks are available as required.

Most of the re-rollers continue to be short of work and demands for most of their products is disappointing, particularly in the case of small bars and light sections. Requirements of home users is slow to recover, and export business is difficult to obtain against the competition experienced. Demand for billets and blooms are moderate, and home steelworks could supply much larger quantities than those at present required. The re-rollers, however, are confining their purchases to cover the work on hand.

Non-ferrous Metals

Copper is a better market in New York than in London. In America the custom smelters are now quoting 31 cents a pound, an increase of half a cent on the previous level. The producers' price remains at 30 cents and there are no indications that this will be changed in the near future.

In London demand is routine, but the prices have edged higher on the Cerro de Pasco labour strike and the fact that the New York market continues firm. There is, too, the point that Russia will presumably buy more copper from Europe now that the US Government has imposed restrictions on the export of the metal to the Soviet block. On the other hand, stocks in LME warehouses rose for the fourth successive week and now stand at 6,970 tons. A fair proportion of this tonnage is thought to be in the form of electrolytic wire bars.

Tin has been very much in the news on the International Tin Council's decision to raise the export quotas for the second quarter by 3,000 tons to 23,000 tons, an increase of 15 per cent. In many ways this came as a surprise to the market, which had been rising on the hopes that the former quota would be maintained for just one more period. After falling sharply on the news, the market firmed up on the view that the additional 3,000 tons should be absorbed without too much difficulty, provided US consumption was maintained at its present levels. The council also announced that a very substantial part of the tin bought with the Special Fund had been sold and that an announcement would be made when all of the metal had been cleared.

In any event, the market in London continues steady—a fact reflected by the continued decline in warehouse stocks, which, at the end of last week, totalled 13,485 tons. In the US the price is fluctuating narrowly around 103 cents a pound.

Lead continues its uneventful course and there is nothing on the horizon to indicate a change in this metal's bleak outlook. In the US the price is now called 11 cents a pound, a reduction of half a cent on the previous level. Zinc remains a relatively satisfactory market both in London and New York. The East St. Louis spot price is unchanged at 11½ cents a pound.

Dowty Group's Interim Dividends

Estimating profits of about £2,000,000 for the year ending March 31, 1959, the directors of the Dowty Group, Limited, manufacturers of mining hydraulic equipment, aircraft landing equipment, etc., declare a 5 per cent. interim payable March 6, and a further interim of 6½ per cent. to be paid on May 8. There will be no final and the 11½ per cent. total is the same as for last year.

The board has now reviewed the financial position of the group and of Rotol, Limited, acquired towards the end of last year, and, having regard to the increased liquidity of the group and the fact that the Rotol overdraft has now been appreciably reduced, has decided to issue only 1,920,000 new shares instead of 2,400,000 as originally proposed. This will provide two new shares for every five existing shares held and not one for two as originally intended.

The proposed issue will not qualify for the interim dividends and the payment of a second interim in place of a final avoids having the new shares in issue with different rights to those of the existing shares.

Hadfields Cuts Dividend

Fall in group net profit from £452,486 to £183,648 for the year to September 27, 1958, is announced by Hadfields, Limited, the Sheffield steelmakers, etc. Total dividend on the £3,683,816 one-class capital is being cut from 9 per cent. to 6 per cent. The proposed final is 2 per cent., compared with 5 per cent. The lower dividend follows the directors' warning last June when the maintained 4 per cent. interim dividend was announced.

The directors state that trading profits were adversely affected by increasing costs resulting from a fall in demand, together with a change in the types of products required, particularly during the latter part of the year.

Mr. HAROLD SMITH, a managing director of the general chemicals division of Imperial Chemical Industries, Limited, has been appointed chairman of the division.

Baker Perkins Machinery at work . . . . . *at Peter Brotherhood Ltd.*

Peter Brotherhood Ltd. use this 'Cadet' Rotary Table Shot Blast Machine for a wide range of application at a high production rate. Note especially the control desk which includes signal lights, 24 volt current socket for inspection and ammeters indicating the shot output of the impeller. The wiring circuit is arranged for automatic operation to cut out human errors.

Please write for further details to:

BAKER PERKINS
Foundry Machinery Division
BEDEWELL WORKS · HEBBURN ON TYNE · ENGLAND

BP/F2

HISTORICAL NOTE

Peter Brotherhood Ltd. were established in London in 1868. In 1907, the works was transferred to Peterborough, Northants. In their Foundry, they produce a wide range of general engineering castings for air and gas compressors, steam turbines, steam engines, refrigeration plant, water turbines, chemical filtration plants, textile machinery, brewery machinery, and many other applications

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

February 25, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 0s. 0d. to £43 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £56 10s. 0d. to £60 10s. 0d., scale 15s. 0d. to 16s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 7s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 10s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £77 0s. 0d. to £81 0s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; over 6 per cent. C, £74 10s. 0d. to £77 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 27s. 6d. per unit; 2 per cent. C,* 1s. 7¼d. to 1s. 10¼d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 0.15 per cent. C,* 1s. 9d. to 2s. 0d. per lb. Cr; 0.10 per cent. C,* 1s. 9¼d. to 2s. 0¼d. per lb. Cr; 0.06 per cent. C,* 1s. 9¼d. to 2s. 0¼d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £255 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/72 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (home).—78 per cent., £73 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £240 10s. 0d. to £241 0s. 0d.; three months, £240 5s. 0d. to £240 10s. 0d.; settlement, £240 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 258s. 6d. per cwt. basis; 20 s.w.g., 293s. 6d. per cwt.

Tin.—Cash, £781 0s. 0d. to £781 10s. 0d.; three months, £783 0s. 0d. to £783 10s. 0d.; settlement, £781 10s. 0d.

Lead (Refined Pig).—Second half February, £69 10s. 0d. to £69 12s. 6d.; second half May, £70 12s. 6d. to £70 15s. 0d.

Zinc.—Second half February, £75 2s. 6d. to £75 5s. 0d.; second half May, £73 2s. 6d. to £73 5s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £110 10s. 0d.; rolled zinc (boiler plates), all English destinations, £108 5s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £94 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10½d. per lb.; sheets to 10 w.g., 198s. 6d. per cwt.; wire, 2s. 7½d.; rolled metal, 198s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £153; B6 (85/15), £197; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £191; HTB2 (38 tons), —; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £189; LG3 (86/7/5/2), £198; G1 (88/10/2/½), £252; (88/10/2/1), £240.

Phosphor Bronze.—BS1400, PB1 (AID released), £291 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £207 per ton.

Phosphor Bronze Strip, etc.—Strip, 290s. 9d. per cwt.; wire, 4s. 1½d. per lb.; rods, 3s. 4½d.; tubes, 3s. 4½d.; chill cast bars: solids 3s. 3¾d.; cored 3s. 4¾d. (CHARLES CLIFFORD LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9¾d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £74 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £230; AB2, £244.